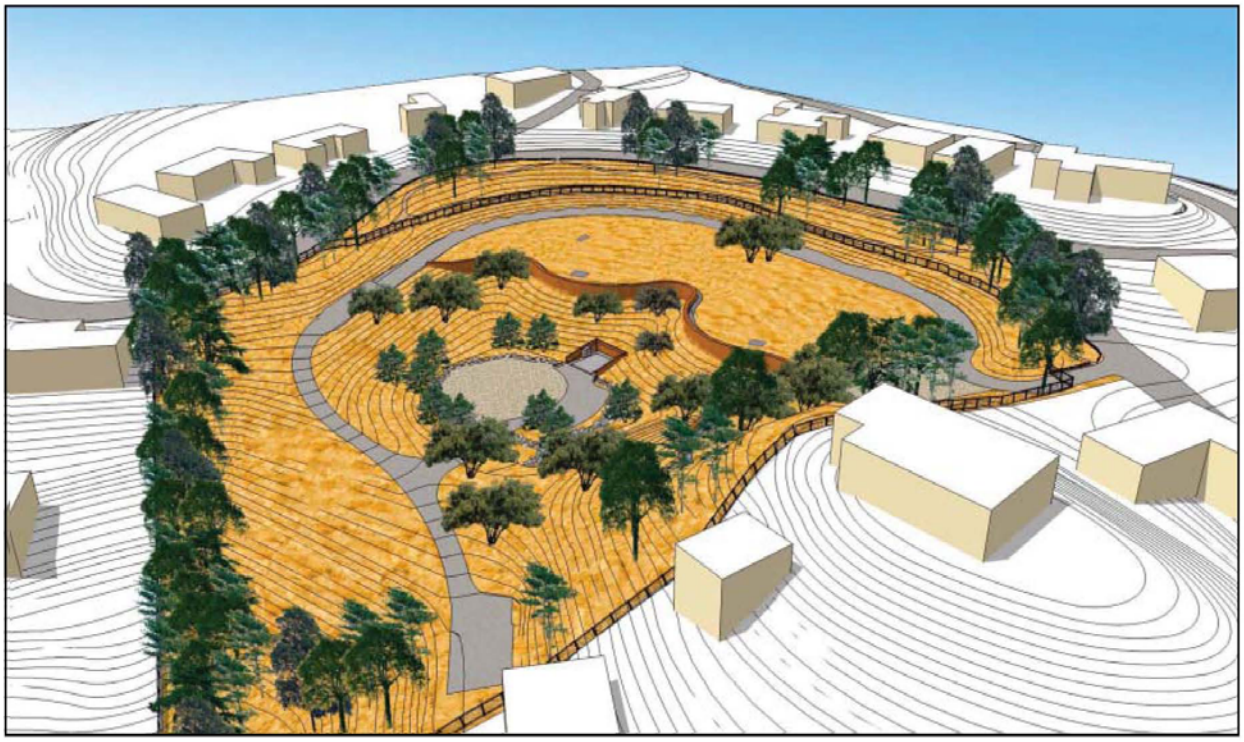
Estates Reservoir Replacement

Draft Environmental Impact Report

State Clearinghouse # 2008082060



East Bay Municipal Utility District

August 2009

August 17, 2009

NOTICE OF AVAILABILITY

Estates Reservoir Replacement Project
Oakland, Alameda County
Draft Environmental Impact Report

Notice is hereby given that a Draft Environmental Impact Report (EIR) is available for public review. The project proponent is the East Bay Municipal Utility District (EBMUD), 375 Eleventh Street, Oakland, California 94607-4240. EBMUD is also the Lead Agency, pursuant to the California Environmental Quality Act (CEQA).

Project Description: Facility improvements to the Estates Reservoir and Montclair Pumping Plant are proposed to address long-term issues related to water quality (excess storage), seismic safety and aging infrastructure. Poor water quality occurs in the Dingee Pressure Zone due to excessive reservoir storage volume, which causes little water fluctuation in Estates Reservoir. The embankment dam at the Estates Reservoir does not meet the State of California Division of Safety of Dams desired seismic requirements. As a result, Estates Reservoir is operating at a reduced capacity of about 13.4 million gallons (MG). In addition, the existing roof structures of Estates does not meet current seismic standards. The proposed project involves the removal of the Estates Reservoir roof, roof features and supporting structures, and construction of two buried 3.3- MG replacement tanks. The entire reservoir bowl will be landscaped with a mixture of drought tolerant, native grasses and shrubs, interspersed with trees. Existing landscaping will be preserved. The project also includes improvements at the Montclair Pumping Plant, specifically upgrade of the existing pumps, motors and related appurtenances within the existing structure.

Significant Impacts: Analysis of environmental impacts associated with the Estates Reservoir Replacement Project identified potentially significant impacts in the following areas: Visual Quality; Geology, Soils and Seismicity; Biological Resources; Cultural Resources; Traffic and Circulation; Air Quality; Greenhouses Gases/Climate Change; and Noise and Vibration. Most of these impacts would be mitigated to less-than-significant levels by implementation of mitigation measures. There are three impacts that are considered significant and unavoidable even with mitigation; Cultural Resources (the Estates Reservoir roof and features); Traffic and Circulation (La Salle, west of Trafalgar), and Noise/Vibration (construction noise). Cumulative impacts are also addressed in the Draft EIR.

Hazardous Waste Disclosure: Section 15087 (c)(6) of the *CEQA Guidelines* requires that this notice specify whether the project sites are on any of the lists enumerated under Section 65962.5 of the California Government Code. The Estates Reservoir site is not on any list.

Public Review: Persons interested in reviewing the Draft EIR, receiving a copy of the Draft EIR or in reviewing documents referenced in the Draft EIR should contact Gwendolyn A. Alie, Associate Planner, EBMUD, at estateseir@ebmud.com. The Draft EIR and all documents referenced in the EIR are available for public review at the EBMUD office located at 375 Eleventh Street in Oakland. The Draft EIR is available for public review at the libraries listed below, or by download at the EBMUD website www.ebmud.com.

Public Library - Monclair Branch
)untain Blvd.
, CA 94607

Public Library - Main Branch
Street
, CA 94612

Public meetings: **A** public meeting is scheduled to review the Draft EIR, on September 21, 2009, from 7:00-9:00 p.m., at the Zion Lutheran Church, 5201 Park Boulevard., Oakland. Other meetings may be scheduled, if required.

Deadlines: The public review period is from August 17, 2009 through October 16, 2009. Comments must be received by October 16, 2009, at 4:30 p.m. Written comments should be submitted to Gwendolyn A. Alie, Associate Planner, MS #701, 375 Eleventh Street, Oakland California 94607-4240 or emailed at estateseir@ebmud.com. Action on the Draft EIR is currently scheduled to be taken by the EBMUD Board of Directors at a regularly scheduled board meeting in December 2009 or January 2010, at 375 Eleventh Street, Oakland, California.

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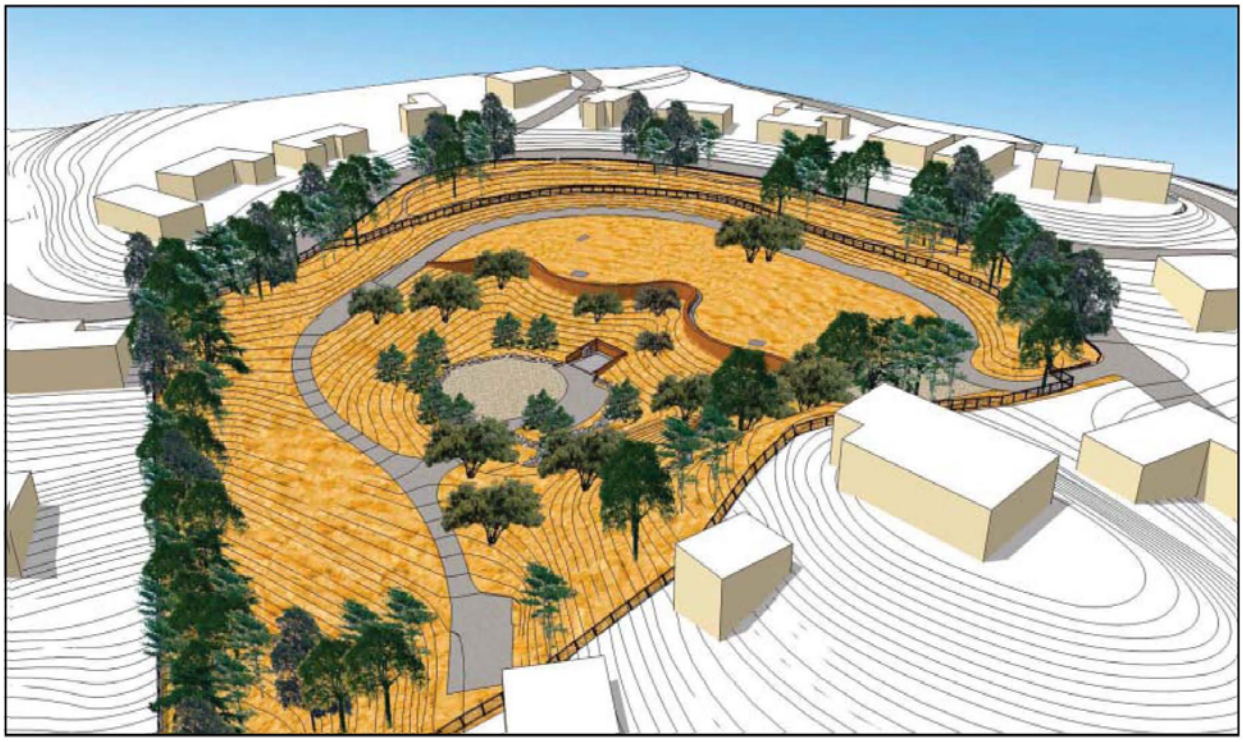

Prepared by
East Bay Municipal Utility District

August 2009

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ACRONYMS AND ABBREVIATIONS

AB	Assembly Bill
ABAG	Association of Bay Area Governments
APCD	Air Pollution Control District
AQMD	Air Quality Management District
ARB	Air Resources Board
AST	above-ground storage tank
ASTM	American Society for Testing and Materials
BAAQMD	Bay Area Air Quality Management District
BART	Bay Area Rapid Transit
BMPs	best management practices
CAAQS	California Ambient Air Quality Standards
Cal-EPA	California Environmental Protection Agency
Caltrans	California Department of Transportation
CAP	Clean Air Plan
CAPCOA	California Air Pollution Control Officers Association
CARB	California Air Resources Board
CCR	California Code of Regulations
CCWC	Contra Costa Water Company
CDFG	California Department of Fish and Game
CDMG	California Division of Mines and Geology
CDSM	cement-deep-soil-mixing
CEQA	California Environmental Quality Act
CESA	California Endangered Species Act
CFCs	chlorofluorocarbons
CFR	Code of Federal Regulations
CGS	California Geological Survey
CH_4	methane
CIWMB	California Integrated Waste Management Board
CNDDB	California Natural Diversity Database
CNEL	Community Noise Equivalent Level
CNPS	California Native Plant Society
CO	carbon monoxide
CO_2	carbon dioxide

Corps	United States Army Corps of Engineers
CORTESE	Cortese Hazardous Waste and Substances Sites List
CRHR	California Register of Historical Resources
dB	decibel
dBA	a-weighted noise levels in decibels
DHS	Department of Health Services
DPM	diesel particulate matter
DSOD	Division of Safety of Dams
DTSC	Department of Toxic Substances Control
EBMUD	East Bay Municipal Utility District
EBRPD	East Bay Regional Park District
EDR	Environmental Data Resources
EIR	Environmental Impact Report
EPS	emission performance standard
ESU	Evolutionarily Significant Unit
FEMA	Federal Emergency Management Agency
FESA	Federal Endangered Species Act
FINDS	Facility Index System
g	gravity
GIS	Geographic Information System
GHG	greenhouse gases
GWP	global warming potential
H_2O	water or water vapor
HCFCs	hydrochlorofluorocarbons
HFCs	hydorfluorocarbons
Highway 13	Warren Freeway
in/sec	inches per second
I-580	Interstate 580
I-680	Interstate 680
IPCC	Intergovernmental Panel on Climate Change
Ldn	day-night noise level
Leq	steady-state energy level
LOS	level of service
M	magnitude

MCE	maximum credible earthquake
MCLs	Maximum Contaminant Levels
mg	milligram
MG	million gallons
mgal/yr	million gallons of water annually
mgd	million gallons per day
MM	Modified Mercalli
Mmax	maximum moment magnitude
mph	miles per hour
MRZs	Mineral Resource Zones
msl	mean sea level
MTC	Metropolitan Transportation Commission
Mw	moment magnitude
N_2O	nitrous oxide
NAAQS	National Ambient Air Quality Standards
NAHC	Native American Heritage Commission
NMFS	National Marine Fisheries Service
NMVOC	nonmethane volatile organic compounds
NO_2	nitrogen dioxide
NOP	Notice of Preparation
NOx	nitrogen oxides
NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resources Conservation Service
O_3	ozone
OAP	Ozone Attainment Plan
OPR	California Office of Planning and Research
OSHA	Occupational Safety and Health Administration
PGA	peak ground acceleration
PG&E	Pacific Gas and Electric Company
PM_{10}	particulate matter 10 microns in diameter or less
$PM_{2.5}$	particulate matter 2.5 microns in diameter or less
ppm	parts per million
ppmv	parts per million by volume
ppmw	parts per million by weight

PPV	peak particle velocity
PRC	Public Resources Code
PUC	Public Utilities Commission
RCRA	Resource Conservation and Recovery Act
RHAA	Royston Hanamoto, Alley and Abey
ROG	reactive organic gases
RWQCB	Regional Water Quality Control Board
SF_6	sulfur hexafluoride
SMARA	Surface Mining and Reclamation Act
SO_2	sulfur dioxide
SR	State Route
SVP	Society of Vertebrate Paleontology
SWPPP	Stormwater Pollution Prevention Plan
SWRCB	State Water Resources Control Board
UCMP	University of California Museum of Paleontology
UCBMVZ	University of California, Berkeley, Museum of Vertebrate Zoology
UNFCCC	United Nations Framework Convention on Climate Change
USC	United States Code
USDA	United States Department of Agriculture
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
UST	underground storage tank
VOCs	volatile organic compound
WTP	water treatment plant

SUMMARY

S.1 Introduction

This Draft Environmental Impact Report (EIR) assesses the potential impacts of the Estates Reservoir Replacement Project (the Project) proposed by the East Bay Municipal Utility District (EBMUD). **Figure S-1** identifies the Project location, as well as nearby cities and major roadways in the Project vicinity, and shows the disposition of the three reservoirs in the Dingee Pressure Zone. The Piedmont Reservoir is presently out of service and the Dingee Reservoir will be removed from service once the Project is constructed and in service.

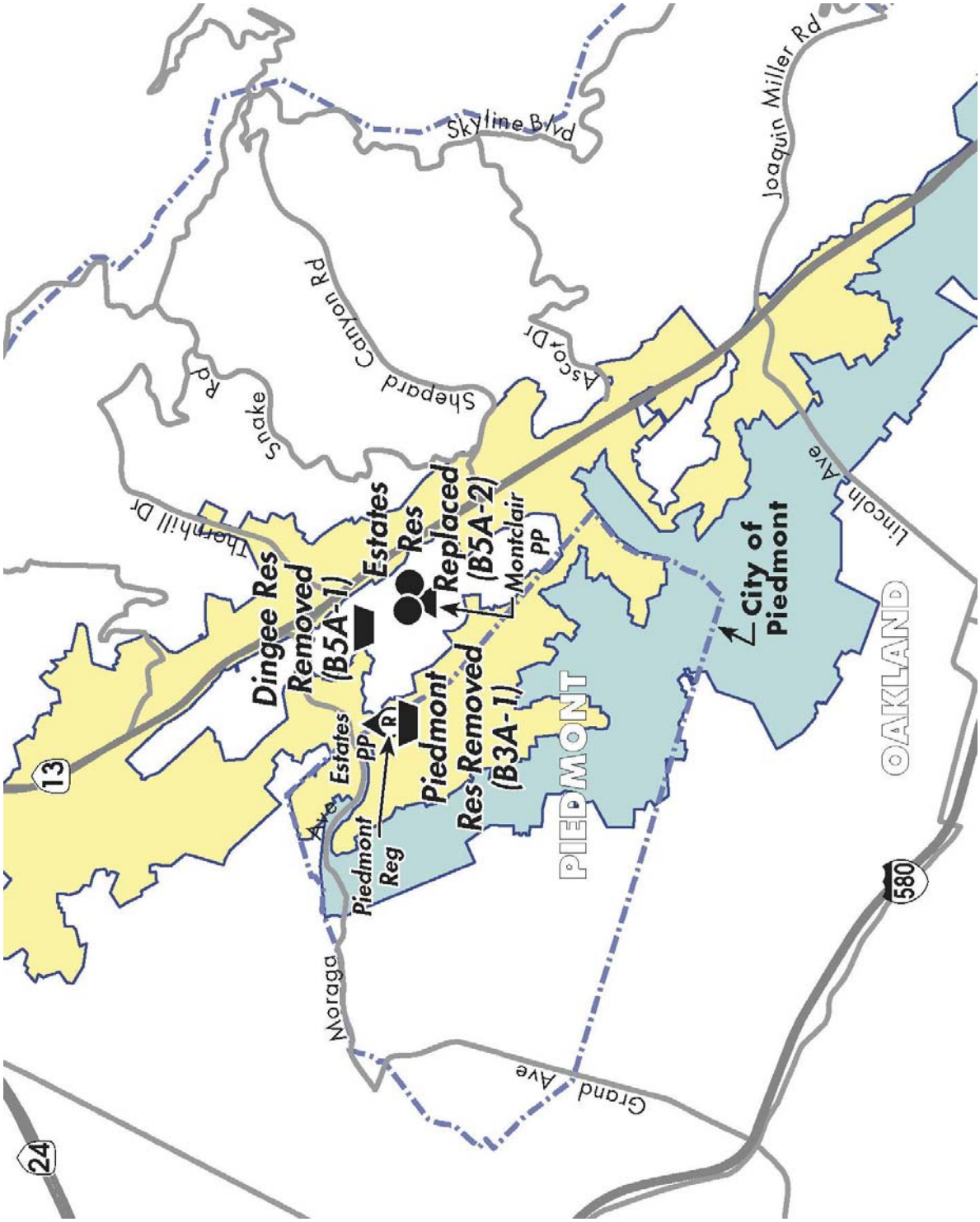
This document has been prepared in accordance with the California Environmental Quality Act (CEQA) statutes and guidelines. EBMUD is the lead agency for this CEQA process. Written comments about the Project or EIR should be directed to:

Gwen Alie, Associate Planner
East Bay Municipal Utility District
375 Eleventh Street (Mail Slot 701)
Oakland, CA 94607-4240
galie@ebmud.com

S.2 Background

Estates Reservoir is located on a 6.7-acre parcel of land on the south side of Estates Drive, at 6317 Estates Drive, in the City of Oakland. The site is situated west of Highway 13, south of Moraga Road and north of Park Avenue. Estates Reservoir is one of two open-cut reservoirs in the Dingee Pressure Zone; Dingee Reservoir is the other reservoir also located on the South side of Highway 13, approximately 500 feet to the north of Estates Reservoir, on Bullard Drive. Both the Estates and Dingee Reservoirs are currently in service. The Montclair Pumping Plant is located at the Estates Reservoir site. **Figure S-1** also shows the location of all three facilities.

The proposed Estates Reservoir Replacement Project will improve water quality and increase system reliability and operating efficiency by removing excess, inefficient storage and aging facilities requiring major rehabilitation or replacement in the Dingee Pressure Zone. The Project will also address seismic issues related to the Estates reservoir embankment in response to a 2004 letter request by the California Division of Safety of Dams (DSOD) for seismic study and remediation of the Estates Dam. Based on consultant seismic studies, EBMUD determined that there was a potential for crest deformation and settlement and that redesign of the facility was required. In the interim, the Estates Reservoir is currently operating at a reduced capacity of about 13.4 million gallon (MG) compared to its original capacity of 17.6 MG. In addition, the existing roof structure does not meet current seismic requirements.



Source: EBMUD

Estates Reservoir Replacement Vicinity/Location Map
Figure S-1

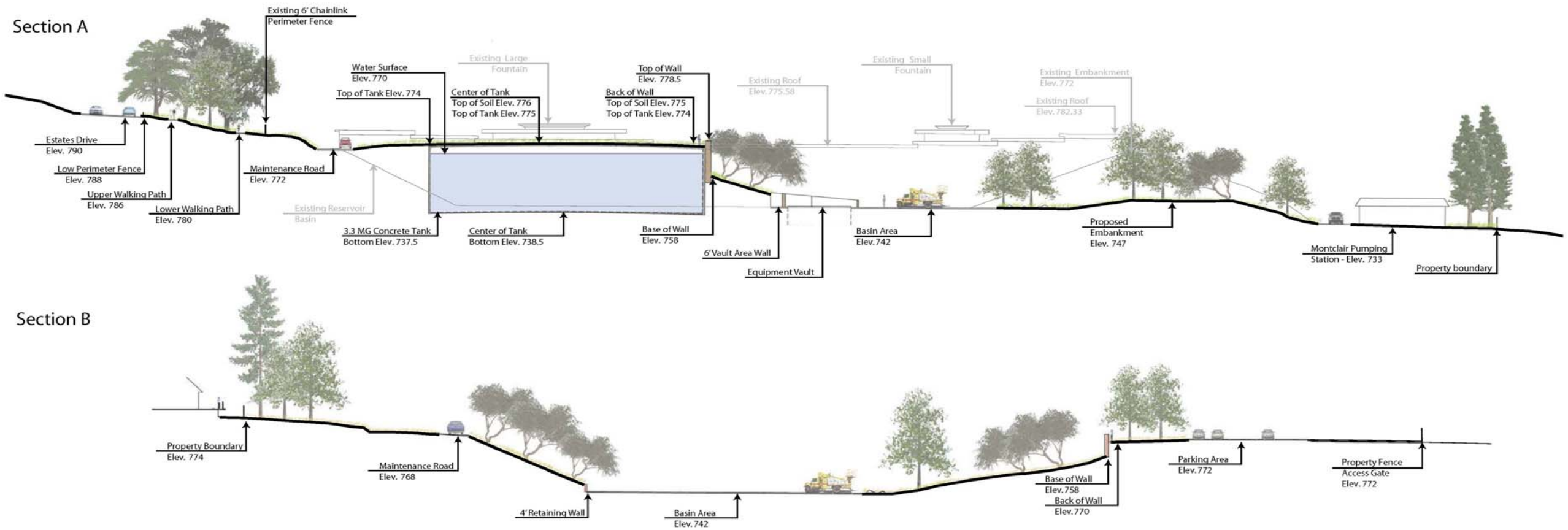
S.3 Project Description

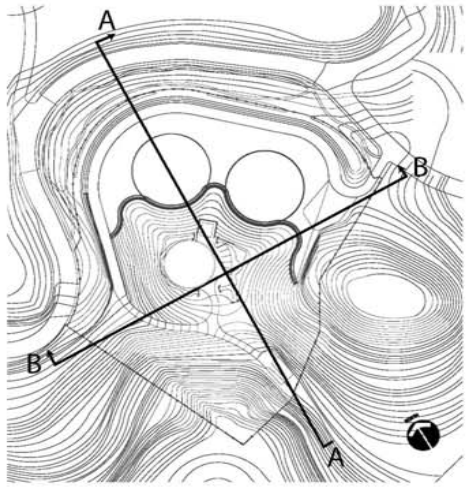
The Project involves the demolition of the entire existing open-cut Estates Reservoir followed by the construction of two 3.3-MG buried concrete tanks with landscaping and associated appurtenances. **Figure S-2** depicts the proposed site plan and cross-sections for the existing and proposed replacement facilities at the Estates Reservoir site. Improvements at the Montclair Pumping Plant, located on the same site, include an upgrade of existing pumps and motors including the instrumentation, motor control centers, transformers and related appurtenances. No changes to the footprint or plant structure are proposed.

Demolition of the Estates Reservoir would entail removing the fountains, roof and supporting timbers, concrete planter and concrete reservoir basin lining, and reducing the height of the earth dam embankment. Some of the structural concrete and soil removed from the embankment will be recycled and incorporated into the proposed grading and landscape plan. The bulk of the existing roofing material, plywood sheathing, and timber framing system cannot be reused on-site.

The design of the two partially buried replacement 3.3-MG concrete tanks has been integrated into and is an integral element of the replacement landscape site design. The interior tank site (basin) will be landscaped with a mixture of native grasses, shrubs and trees. An improved (looped) pedestrian path will be added in response to residents' concerns about pedestrian and traffic safety. Existing bushes along the perimeter will be thinned while the lower braches of existing trees will be pruned to address fire prevention and security concerns; this pruning will also open public views into the site. The existing vehicular access point to the site from Estates Drive will be maintained. New interior parking for EBMUD vehicles and equipment will be provided in two areas which will be screened to the extent feasible.

In response to EBMUD's Vulnerability Assessment Program- Security Upgrades, the existing chain-link security fence along the site perimeter will be replaced at the existing location. The fence height will increase from six to eight feet, and the mesh size will change from two inches to one inch. The new security fence will also be black-vinyl-coated.





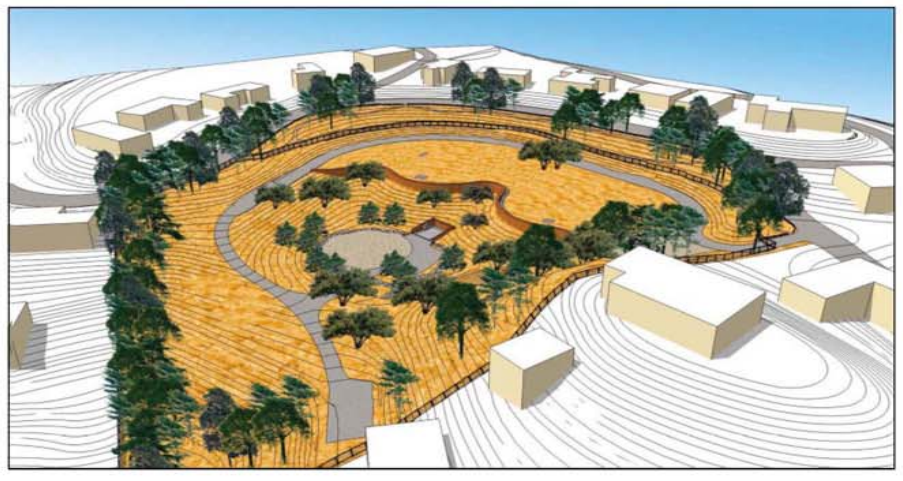


Figure 3.13 - Preferred Alternative Sections Board[1]

Source : RHHA 2009

Estates Reservoir Proposed Site Plan and Cross-Sections
Figure S-2

S.4 Summary of Impacts

Table S-1 below is a summary of all significant impacts and required mitigation and less than significant impacts (including impacts identified as "not significant" or "no impact" in the analysis in Chapter 3) where mitigation is not required. For all significant impacts, the significance after mitigation is determined.

TABLE S-1
Estates Reservoir Replacement Project
Summary Of Impacts And Mitigation Measures

ENVIRONMENTAL IMPACT	MITIGATION MEASURES	SIGNIFICANCE AFTER MITIGATION
VISUAL QUALITY		
Impact 3.2-1: Project construction could generate visual impacts experienced in the short-term from nearby areas during construction.	**Measure 3.2-1:** EBMUD will require the contractor to ensure that the construction site is clean by storing building materials and equipment within the proposed staging areas in the reservoir bowl, or in areas removed from public view, and by frequent removal of construction debris that is not to be reused on-site. Construction phasing shall be organized to minimize equipment storage on-site. EBMUD will also use interpretive materials to explain the need for the Project, in attractive and simple graphic displays. Signage locations could include, but would not be limited to, areas near the Estates Reservoir entry, along Estates Drive and the residentially developed segments of the truck route.	Less than Significant.
Impact 3.2-2: Project construction could alter the site's appearance and long-term visual effects.	**Measure 3.2-2:** ▪ A landscape plan for the Estates Reservoir Replacement Project will be prepared during the Design Phase that will be consistent with the 2008 RHAA Concept Design Process and Recommendations Report (updated 2009), and ensure that areas disturbed by construction are re-graded and planted to result in landforms that are compatible with existing site topography and landscaping, as well as the neighborhood setting. ▪ Annual vegetation/tree pruning, consistent with City of Oakland Fire Department Fire Abatement Regulations, will continue to be implemented.	Less than Significant.

ENVIRONMENTAL IMPACT	MITIGATION MEASURES	SIGNIFICANCE AFTER MITIGATION
	▪ EBMUD will coordinate with neighborhood representatives regarding the placement of new plantings to effect screening., and this input will be incorporated into the Final Landscape Plan. ▪ The contractor shall be required to warrant landscape plantings for one year after project completion. ▪ EBMUD will ensure that the contractor restores graded, disturbed areas to a natural-appearing landform. ▪ Site improvements will include aesthetic/architectural treatment where facilities are located near to, or are visible from, public trails and residences, namely: - Creating a new drainage feature with rocks and stones, around the reservoir valve pit at the base of the excavated basin. - Improving the existing trail on EBMUD property, along Estates Drive. - Constructing a low, rustic, wooden fence along Estates Drive. - Constructing a parking area for EBMUD equipment and staff vehicles in the valve pit area. - Replacing the existing six foot high, two-inch web, perimeter chain-link security fencing, with an eight-foot high, one-inch web chain link fence in the same location. The new fence will be the same color as the existing fence, black.	
Impact 3.2-3: Effects on a scenic vista.	**Mitigation Measure: Not Required**: The Project site is not within a defined scenic vista. Existing perimeter vegetation along Estates Drive allows only filtered views into the site from adjacent residences. Mature trees on the dam downslope block distant views of the Bay. Project demolition and construction will occur within the bowl of the existing reservoir and will not create or open scenic vistas. Reduction of the dam embankment by 25 feet will open views to the lower site but mature trees along the embankment slope (towards Woods Drive) will continue to block/filter distant views of the Bay.	

ENVIRONMENTAL IMPACT	MITIGATION MEASURES	SIGNIFICANCE AFTER MITIGATION
Impact 3.2-4: Project construction could affect views from the surrounding area, including public roadways, public trails and open space and residential areas.	**Measure 3.2-4:** Implement Measures 3.3-2, as detailed above.	Less than Significant.
Impact 3.2-5: Project construction could generate new sources of light and glare.	**Measure 3.2-5:** EBMUD will ensure that stationary lighting used during nighttime construction (if required) is of limited duration and shielded and directed downward or oriented such that little or no light is directly visible from Estates Drive. No permanent nighttime lights will be constructed on the site.	Less than Significant.
GEOLOGY, SOILS AND SEISMICITY		
Impact 3.3-1: New slopes associated with reservoir construction may be potentially unstable.	**Measure 3.3-1:** During the design phase, EBMUD will perform geotechnical evaluations and if required, conduct site specific geotechnical investigation/exploration/testing to reduce or eliminate potential slope hazards. Design and construction specifications will incorporate the recommendations from the geotechnical evaluation for any slope stabilization, which may include some of the following measures, although this list is not exclusive: ▪ Appropriate slope inclination ▪ Slope terracing ▪ Fill compaction ▪ Soil reinforcement ▪ Surface and subsurface drainage facilities ▪ Retaining walls ▪ Buttresses ▪ Erosion control measures - Sub drain system - Soil nails or anchors	Less than Significant.

ENVIRONMENTAL IMPACT	MITIGATION MEASURES	SIGNIFICANCE AFTER MITIGATION
Impact 3.3-2: Facility damage or service interruptions resulting from strong ground shaking.	**Measure 3.3-2**: During the design phase, EBMUD will perform a geotechnical evaluation and, if required, conduct site specific geotechnical investigations and evaluations to identify the potential for secondary ground failure hazards (i.e., seismically-induced settlement). The geotechnical evaluation will provide recommendations for applicable settlement mitigation measures to be incorporated in the design and construction specifications for the replacement reservoirs.	Less than Significant.
Impact 3.3-3: Facility damage resulting from settlement or uplift caused by compressible soils.	M**easure 3.3-3a:** The tank structures will be supported by 1) select engineered fill founded on bedrock after removal of the soils above the bedrock or 2) cast-in-place concrete pier foundations obtaining vertical support from the bedrock without removing the overlying soils. These measures will reduce the potential settlement to within the acceptable limits. **Measure 3.3-3b:** EBMUD will include in the contract specifications that any fill will be selected, placed, compacted, and inspected in accordance with plans and specifications prepared by a licensed professional engineer.	Less than Significant.
Impact 3.3-4: Exposure of soils to erosion after removal of the concrete lining within the existing reservoir basin.	**Measure 3.3-4**: Grading for the reservoir construction will be performed in compliance with the Stormwater Pollution Prevention Plan to control/manage soil erosion and run-off. During grading construction, sprinkling will be performed regularly to control dust at the site. Measures for winterization, including hydro-mulching, straw bale installation, and/or other measures will be performed to minimize soil erosion during the rainy seasons.	Less than Significant.
Impact 3.3-5: Stockpiled materials from import or excavation of the existing dam could cause localized instability of slopes.	**Measure 3.3-5**: Due to limited construction working space at the site, stockpiling of imported or locally excavated materials will be minimized. In general, the imported materials will be placed directly at the intended fill areas and the locally excavated materials not proposed for reuse on-site will be off hauled shortly after excavation.	Less than Significant.
BIOLOGICAL RESOURCES		
Impact 3.4-1: Loss of, or damage to protected trees.	**Measure 3. 4-1:** No trees are scheduled to be removed from the site, but inadvertent damage may occur during construction. EBMUD will develop and implement a five-year tree monitoring program for any protected trees lost or damaged by project construction. Appropriate performance standards may include, but are not limited to a not less than 75 percent survival rate of replacement tree plantings and a requirement that trees be able to be self-sustaining at the end of five years.	Less than Significant.

ENVIRONMENTAL IMPACT	MITIGATION MEASURES	SIGNIFICANCE AFTER MITIGATION
Impact 3.4-2: Disturbances to nesting raptors or special status nesting birds.	**Measure 3.4-2:** EBMUD will avoid disturbing active nests of special-status nesting birds by performing preconstruction surveys and creating no-disturbance buffers. If construction activities (i.e., ground clearing and grading, including removal of trees or shrubs) are scheduled to occur during the non-breeding season (September 1 through January 31), no mitigation is required. If construction activities are scheduled to occur during the breeding season (February 1 through August 31), EBMUD will implement the following measures to avoid potential adverse effects on nesting raptors and other special-status birds: EBMUD will retain a qualified wildlife biologist to conduct preconstruction surveys of all potential nesting habitat within 500 feet of construction activities where access is available. If active nests are found during preconstruction surveys, EBMUD will create a no-disturbance buffer (acceptable in size to the California Department of Fish and Game, CDFG) around active raptor nests and nests of other special-status birds during the breeding season, or until it is determined that all young have fledged. The size of these buffer zones and types of construction activities restricted in these areas will be based on existing noise and human disturbance levels at the Estates Reservoir Project site. Nests initiated during construction are presumed to be unaffected by the activities occurring, and no buffer would be necessary. If preconstruction surveys indicate that nests are inactive or potential habitat is unoccupied during the construction period, no further mitigation is required. Trees and shrubs within the construction footprint that have been determined to be unoccupied by special-status birds or that are located outside the no-disturbance buffer for active nests may be removed.	Less than Significant.
Impact 3.4-3: Loss or damage to special – status plants and sensitive natural communities.	**Mitigation Measure: None Required:** The Estates Reservoir site is within a large-scale, well established residential neighborhood and has been maintained as a manicured landscape for several decades. Ornamental vegetation on the site and in the surrounding neighborhood has decreased (if not eliminated) the value of on-site vegetation for native wildlife habitat. The Estates Reservoir Project will therefore not have a significant adverse impact on biological resources, or to special status/sensitive plants and communities. Because of the extensive grass, shrub and tree planting proposed as part of the Project, the Project will, in fact, increase the potential for habitat for native species with the planting of native coast live oak, California Sycamore and California buckeye. This impact is considered beneficial and no further discussion is offered nor are mitigation measures required.	

ENVIRONMENTAL IMPACT	MITIGATION MEASURES	SIGNIFICANCE AFTER MITIGATION
Impact 3.4-4: Loss of or impact to wetlands.	**Mitigation Measure: None Required:** The Estates Reservoir site has no jurisdictional wetlands as defined by Section 401 and 404 of the Clean Water Act and Sections 1600-1606 of the California Fish and Game Code. No construction activities for the Estates Reservoir Replacement Project would occur at or near (within 100 feet) of streams, wetlands or riparian habitat. Therefore there will be no impacts from Project construction on features potentially subject to Section 401 and 404 of the Clean Water Act, and Sections 1600-1616 of the California Fish and Game Code.	
CULTURAL RESOURCES		
Impact 3.5-1: Substantial adverse change to the historic significance of the Estates Reservoir roof. Demolition of the Estates Reservoir roof would permanently eliminate a historic resource recommended as eligible for listing on the California Register of Historic Resources.	**Measure 3.5-1**: EBMUD will prepare a Historic American Building Survey/Historic American Engineering Record style documentation of the Estates Reservoir roof designed by Robert Royston. The level of documentation will be similar to that described in Historic American Building Survey documentation level II, which includes at a minimum, measured drawings such as as-builts or original design plans, historic photographs, if available, current large-format photographs of significant architectural design features, and a written history and description. The documentation will be submitted to the Oakland Heritage Alliance, the Oakland Historical Archives and the UC Berkeley Historical Archives. The intent is to reduce the adverse effect associated with a loss of historical information; it will not prevent the physical loss of the resource, and a significant and unavoidable residual impact will remain.	Significant and Unavoidable (After Mitigation)
Impact 3.5-2: Substantial adverse changes to the significance of currently unknown historical or prehistoric resources, including unique archeological resources.	**Measure 3.5-2**: If deposits of prehistoric or historic archeological materials are encountered during Project activities, all work within 25 feet of the discovery will be stopped and a qualified archeologist meeting federal criteria under 36 CFR 61 will be contacted to assess the deposit(s) and make recommendations. Deposits of prehistoric or historic archeological materials should be avoided by Project activities. If the deposits cannot be avoided, they will be evaluated for their potential historic significance. If the deposits are recommended to be non-significant, avoidance is not necessary. If the deposits are determined to be potentially significant, they will be avoided. If avoidance is not feasible, Project impacts will be mitigated in accordance with the recommendations of the evaluating archaeologist and CEQA Guidelines §15126.4 (b)(3)(C), which require development and implementation of a data recovery plan that would include recommendations for the treatment of the discovered archaeological materials. The data recovery plan will be submitted to EBMUD for review and approval. Upon approval and completion of the data recovery program, Project construction activity within the area of the find may resume, and the archaeologist will prepare a report documenting the	Less than Significant

ENVIRONMENTAL IMPACT	MITIGATION MEASURES	SIGNIFICANCE AFTER MITIGATION
	methods and findings. The report will be submitted to EBMUD. Once the report is reviewed and approved by EBMUD, a copy of the report will be submitted to the Northwest Information Center.	
Impact 3.5-3: Damage to previously unidentified human remains.	**Measure 3.5-3:** Section 7050.5(b) of the California Health and Safety Code will be implemented in the event that human remains, or possible human remains, are located during project related construction excavation**.** In the event of discovery or recognition of any human remains in any location other than a dedicated cemetery, there shall be no further disturbance of the site or any nearby area suspected to overlie adjacent remains until the County Coroner has investigated the circumstances, manner and cause of death in accordance with Chapter 10 of the Government Code and determined that the remains are not subject to the provisions of Section 27492 of the Government Code, and the recommendations concerning treatment and disposition of the remains have been communicated to the person responsible for the excavation, per Section 5097.98 of the Public Resources Code. If the remains are recognized as of Native American origin, the County Corner shall contact the Native American Heritage Commission within 24 hours, to provide guidance as to ultimate disposition.	Less than Significant
TRAFFIC AND CIRCULATION		
Impact 3.6-1: The construction phase of the proposed Project would generate short-term vehicle trips by trucks and construction workers and would represent an increased traffic load on the roadways surrounding the Project site.	**Measure 3.6-1:** EBMUD contract specifications shall require preparation and implementation of a Traffic Management Plan, and collaboration with the City of Oakland and California Highway Patrol, as appropriate. The Plan will include the following elements: ▪ The work hours for each phase of project construction, the process for notifying residents of construction activity, and the means for people to report construction-related problems. ▪ A haul route, based on the route shown on Figure 3.6-5 that shall be provided to all trucks serving the site during the construction period. Should the recommended one-way truck access route not be implemented and trucks routed to Estates Drive south of the Project site, there is sufficient capacity on Estates Drive south of the Project site to accommodate additional traffic volumes associated with the peak construction period. However, a flagger would be required at the Estates Drive/Park Boulevard intersection to direct traffic though that intersection, with an alternative routing plan. ▪ Flaggers at the Project site entrance and at the curve on Estates Drive immediately west of the Project site to improve traffic safety during regular construction hours.	Less than Significant

ENVIRONMENTAL IMPACT	MITIGATION MEASURES	SIGNIFICANCE AFTER MITIGATION
	▪ Flaggers at the Moraga Avenue/Estates Drive intersection during regular construction hours. ▪ A peak-period flagger (7:00 a.m. to 9:00 a.m., and 4:00 p.m. to 6:00 p.m.) at the La Salle Avenue/Moraga Avenue/ Mountain Boulevard intersection. ▪ Control and monitoring of construction vehicle movements through the enforcement of standard construction specifications by EBMUD on-site inspectors. ▪ Signage on Estates Drive and La Salle Avenue warning motorists of the construction work ahead. ▪ Unimpeded through access to the Montclair Pumping Plant site at all times during reservoir construction. ▪ The Traffic Management Plan shall be enforced by EBMUD construction inspectors.	
Impact 3.6-1a: The addition of traffic during the construction phase of the Project would exacerbate an existing deficiency on La Salle Avenue, west of Trafalgar Place. Based on the CEQA significance criteria, this is considered a significant impact. Even with mitigation, this impact would remain significant.	**Measure 3.6-1a:** Implement Mitigation Measure 3.6-1. as noted above.	Significant and Unavoidable, with Mitigation
Impact 3.6-1b: The addition of traffic during the construction phase of the Project would exacerbate an existing deficiency at the SR 13/Moraga Avenue/Estates Drive intersection. Construction traffic would also increase traffic on Estates Drive in locations where the roadway is not wide enough to support	**Measure 3.6-1b:** Implement Mitigation Measure 3.6-1. as noted above.	Less than Significant

ENVIRONMENTAL IMPACT	MITIGATION MEASURES	SIGNIFICANCE AFTER MITIGATION
two-way travel, potentially creating a traffic hazard. An inadequate turning radius at the La Salle Avenue/Moraga Avenue intersection does not allow conflict free (from opposing vehicles) truck turning movements. Construction related traffic could create potential conflicts between transit buses, pedestrians, and bicyclists. Based on the significance criteria, these impacts are considered significant**.**		
Impact 3.6-2: Project construction would generate a demand for parking spaces to accommodate worker vehicles. The impact is significant but can be mitigated to less than significant.	**Measure 3.6-2:** EBMUD shall provide designated on-site parking areas to accommodate all Project-related parking demand. In the earlier construction phases when there may not be sufficient space on-site to accommodate all parking demand, EBMUD's contractor will secure private off-site parking and provide shuttles to bring workers to and from the Project site.	Less than Significant
Impact 3.6-3: Project construction would cause increased wear-and-tear on roadways used by construction vehicles to access the Project site.	**Measure 3.6-3:** EBMUD contract documents will require that road conditions shall be documented for all routes that would be used by construction vehicles both before and after Project construction.	Less than Significant
AIR QUALITY		
Impact 3.7-1: The Project would not conflict with or	**Mitigation Measure: None Required:** General estimated basin-wide construction-related emissions are included in the BAAQMD emission inventory (which, in part, forms the basis for the	

ENVIRONMENTAL IMPACT	MITIGATION MEASURES	SIGNIFICANCE AFTER MITIGATION
obstruct any air quality plans of the BAAQMD, specifically, the BAAQMD Clean Air Plan and Ozone Attainment Plan (BAAQMD 2000).	air quality plans cited above) and are not expected to prevent attainment or maintenance of the ozone, particulate matter, and carbon monoxide standards within the Bay Area. Therefore, construction impacts related to air quality plans for these pollutants from the proposed Project would be less than significant and no mitigation would be required, since they are presently estimated and accounted for in the emission inventory.	
Impact 3.7-2: The Project would have the potential to contribute to the already existing violation of air quality standards in the Project vicinity for PM_{10} and $PM_{2.5}$, primarily through fugitive dust emissions of PM_{10} during demolition and construction, and from PM_{10} and $PM_{2.5}$ emissions from diesel-powered construction equipment.	**Measure 3.7-2a:** The following diesel control measures will be incorporated by EBMUD into contract specifications: ▪ To minimize potential diesel odor impacts on nearby receptors (pursuant to BAAQMD Regulation 1, Rule 301, Nuisance), construction equipment will be properly tuned. A schedule of tune-ups will be developed and performed for all equipment operating within the Project area, particularly for haul and delivery trucks. A log of required tune-ups will be maintained and a copy of the log will be submitted to EBMUD for review every 2,000 service hours. ▪ Fixed temporary sources of air emissions (such as portable pumps, compressors, generators, etc.) will be electrically powered unless the contractor submits documentation and receives approval from EBMUD that the use of such equipment is not practical, feasible, or available (generally contingent upon power line proximity, capacity, and accessibility). California ultra-low sulfur diesel fuel with maximum sulfur content of 15 ppm by weight, or an approved alternative fuel, will be used for on-site fixed equipment not using line power. If sufficient power line capacity is available and practical to use, EBMUD will endeavor to rent if (via the contractor) an electrically-powered concrete crusher in lieu of a diesel powered unit. This will eliminate emissions associated with combustion of approximately 1,800 gallons of diesel fuel. ▪ To minimize diesel emission impacts, construction contracts will require off-road compression ignition equipment operators to reduce unnecessary idling with a two (2) minute time limit. ▪ On-road and off-road material hauling vehicles will shut off engines while queuing for loading and unloading for time periods longer that two (2) minutes. ▪ Off-road diesel equipment will be fitted with verified diesel emission control systems (e.g., diesel oxidation catalysts) to the extent reasonably and economically feasible. ▪ Utilize alternative fuel equipment (i.e., compressed or liquefied natural gas, biodiesel, electric) to the extent reasonably and economically feasible. **Measure 3.7-2b:** To control emissions of particulate matter, the Project shall implement the following fugitive dust and particulate matter emissions control measures suggested by the BAAQMD CEQA Guidelines as applicable (BAAQMD 1999).	Less than Significant.

ENVIRONMENTAL IMPACT	MITIGATION MEASURES	SIGNIFICANCE AFTER MITIGATION
	Basic Dust Control Measures: The following controls will be implemented at all construction sites: ▪ Water and/coarse rock all active construction areas as necessary and indicated by soil and air conditions. ▪ Cover all trucks hauling soil, sand, and other loose materials or require all trucks to maintain at least two feet of freeboard. ▪ Pave or apply (non-toxic) soil stabilizers on all unpaved access roads, parking areas and staging areas at construction sites. ▪ Sweep daily (with water sweepers) all paved access roads, parking areas and staging areas at construction sites. ▪ Sweep streets daily (with water sweepers) if visible soil material is carried onto adjacent public streets. ▪ Suspend excavation and grading activity when sustained winds make reasonable dust control difficult to implement, e.g., for winds over 25 miles per hour. ▪ Limit the area subject to excavation, grading, and other construction activity at any one time, as feasible. **Particulate Matter Emissions Control Measures:** ▪ In addition, the Project shall implement the following measures to reduce particulate matter emissions from diesel exhaust: ▪ Grid power shall be used instead of diesel generators where it is feasible to connect to grid power (generally contingent upon power line proximity, capacity, and accessibility); ▪ The Project specifications shall include 13 CCR Sections 2480 and 2485, which limit the idling of all diesel-fueled commercial vehicles (weighing over 10,000 pounds, both California- or non-California-based trucks) to 30 seconds at a school or 5 minutes at any location. In addition, the use of diesel auxiliary power systems and main engines shall be limited to 5 minutes when within 100 feet of homes or schools while the driver is resting; ▪ The Project specifications shall include 17 CCR Section 93115, Airborne Toxic Control Measure for Stationary Compression Ignition Engines, which specifies fuel and fuel additive requirements; emission standards for operation of any stationary, diesel-fueled, compression-ignition engines; and operation restrictions within 500 feet of school grounds when school is in session;	

ENVIRONMENTAL IMPACT	MITIGATION MEASURES	SIGNIFICANCE AFTER MITIGATION
	▪ A schedule of low-emissions tune-ups shall be developed and such tune-ups shall be performed on all equipment, particularly for haul and delivery trucks; and ▪ Low-sulfur (≤ 15 ppmw S) fuels shall be used in all stationary and mobile equipment. Because these control measures will be implemented, fugitive dust and particulate matter emissions are reduced substantially, and the impact is less than significant.	
Impact 3.7-3: The proposed Project would result in an incremental contribution to a cumulative effect for several criteria pollutants for which the San Francisco Bay region is in non-attainment under an applicable federal or state ambient air quality standard.	**Mitigation Measure: None Required:** As detailed in Impact 3.7-1, the San Francisco Bay Area Air Basin is in non-attainment of State and Federal ozone, PM_{10}, and $PM_{2.5}$ standards for several different averaging times. As detailed in Impact 3.7-2, the on-site operation of heavy equipment during demolition and construction would generate combustion emissions and fugitive dust emissions, resulting in a short-term incremental impact. Off-site vehicle emissions (trucks and worker vehicles) would also contribute to a short-term incremental impact in the San Francisco Bay Area Air Basin. These incremental impacts were determined to be less than significant because EBMUD shall implement the applicable fugitive dust and particulate matter emissions control measures contained in the BAAQMD CEQA Guidelines (BAAQMD 1999) and listed under Impact 3.7-2. The use of newer, less polluting Tier 1, 2, and 3 engines in the majority of construction equipment used on site is a measure for reducing combustion emissions of NO_X, ROC, CO, PM_{10}, and $PM_{2.5}$. Although not a mitigation measure per se, California ultra-low sulfur diesel fuel with a maximum sulfur content of 15 ppm by weight will be used in all diesel-powered equipment which minimizes sulfur dioxide and particulate emissions. The results of the screening analysis for criteria pollutants presented previously show that no exceedence of ambient air quality standards in the Project vicinity would result solely from Project activities. Thus, combustion emissions are less than significant. These small incremental impacts are not cumulatively considerable because EBMUD would comply with specific requirements in the BAAQMD's approved air quality plans for attainment of ozone and particulate matter. In short, these regional plans address the existing and cumulative impact problems.	
Impact 3.7-4: The proposed Project would not expose sensitive receptors to substantial pollutants	**Mitigation Measure: None Required:** The Project site is located in a hillside residential area. Residential uses surrounding the Project site consist of single-family dwellings on Estates Drive, Bullard Drive, Wood Drive, Wood Court, McAndrew Drive, Moyer Place, LaSalle Avenue, Bruns Court, Harbord Drive, Johnston Drive, and other streets in the neighborhood. It is not known whether some residences in the immediate vicinity (i.e., 1,000 feet or 305 meters) of the Project site	

ENVIRONMENTAL IMPACT	MITIGATION MEASURES	SIGNIFICANCE AFTER MITIGATION
concentrations.	might house potentially sensitive persons, but it is probable based on the demographics of persons commenting at public meetings held on Project alternatives. There would be no emissions from long-term storage tank operations to affect sensitive receptors, and minimal emissions from landscape and facilities maintenance. However, as discussed under Impact 3.7-2, demolition and construction activities would cause short-term emissions of NO_X, ROC, CO, SO_2, PM_{10}, and $PM_{2.5}$ from diesel-powered equipment and earthmoving (ground disturbance). The results of the screening analysis contained in the analysis for criteria pollutants show that no exceedence of ambient air quality standards in the Project vicinity would result solely from Project activities. Notwithstanding Project-generated impacts, maximum background levels of particulate matter (PM_{10}, $PM_{2.5}$) already exceed state or federal standards as applicable in the Project vicinity. Diesel particulate matter (DPM) contain substances that are suspected carcinogens, along with pulmonary irritants and hazardous compounds which may affect sensitive receptors such as young children, senior citizens, or those susceptible to respiratory disease. Where construction activity occurs in proximity to long-term sensitive receptors, there could be a potential for unhealthful exposure of those receptors to diesel exhaust, including residential receptors. The results of the screening risk assessment contained in Impact 3.7-2, analyses show that the probability of contracting cancer from diesel particulate matter, for the Maximally Exposed Individual is about 7.5 x 10^{-7}, which is less than the 10 in one million (1 x 10^{-5}) BAAQMD CEQA threshold and thus not significant. Construction emissions are transient and temporary in nature, and BAAQMD control measures would be implemented as described previously. Impacts on sensitive receptors are anticipated to be less than significant, and no further mitigation would be required.	
Impact 3.7-5: The proposed Project would not create objectionable odors affecting a substantial number of people**.**	**Mitigation Measure: None Required:** California ultra-low sulfur diesel fuel, with a maximum sulfur content of 15 ppm by weight, will be used in all diesel-powered equipment which minimizes emissions of sulfurous gases (sulfur dioxide, hydrogen sulfide, carbon disulfide, and carbonyl sulfide). Therefore, no objectionable odors are anticipated from demolition or construction activities or normal operation of the Project. The proposed Project would have no significant impact, and no mitigation would be required.	

ENVIRONMENTAL IMPACT	MITIGATION MEASURES	SIGNIFICANCE AFTER MITIGATION
GREENHOUSE GAS		
Impact 3.8-1: The concern is whether the Estates Reservoir Replacement Project, primarily through construction related emissions, individually would impede the state's ability to meet its 2020 greenhouse gas emission reduction goal.	**Mitigation Measure 3.8-1:** Since the half-life of carbon dioxide is approximately 100 years (USEPA 2008), the effects of greenhouse gases affect global climate change over a relatively long time frame. Thus, the 716 metric tonnes of carbon dioxide equivalents emitted by Project demolition and construction activities would remain in the atmosphere for years. Therefore, mitigation measures are recommended to further minimize the potential for any long-term effects of construction emissions on global climate change. EBMUD and its contractors shall implement the following measures to reduce greenhouse gas emissions from fuel combustion: ▪ On road and off-road vehicle tire pressures shall be maintained to manufacturer specifications. Tires shall be checked and re-inflated at regular intervals. ▪ Construction equipment engines shall be maintained to manufacturer's specifications. ▪ Demolition debris shall be recycled for reuse to the extent feasible (excluding wood treated with preservatives). Implementation of Mitigation Measure 3.8-1, in addition to diesel exhaust control measures as described under Air Quality Impact 3.7-2 (Air Quality Section 3.7) would reduce and sequester greenhouse gas emissions. Additionally, given that other development projects would be required to implement mitigation measures for significant impacts under CEQA, the overall cumulative greenhouse gas impacts would be further reduced.	Less than Significant
Impact 3.8-2: The Project's greenhouse gas emissions reduction from Project operations over the long term would not contribute to a cumulatively considerable impact to climate change.	**Mitigation Measure: None Required:** Cumulative impacts are those that result from the incremental impacts of an action added to other past, present, and reasonably foreseeable future actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time. The only source of direct emissions during Project operation would be associated with periodic inspections and maintenance activities and largely associated with motor vehicles used to transport maintenance workers. These are relatively infrequent events that would not cause long term permanent effects on global climate. Since inspections and maintenance activities are currently performed on the existing reservoir and pumping plant, there would be a negligible change in these emissions, hence, no new impact. (If the storage tanks and facilities require less maintenance than	

ENVIRONMENTAL IMPACT	MITIGATION MEASURES	SIGNIFICANCE AFTER MITIGATION

the existing reservoir, these emissions may actually decrease.)

Permanently eliminating water use by the fountains and reducing reservoir evaporation will also benefit the environment, saving water and electricity used to pump it. The reservoir surface area will be reduced from 2.2 to 0.6 acres, for a net reduction of 1.6 acres. For a one inch per month evaporation rate, this will save about 1.6 acre-feet or 0.52 million gallons of water annually. Fountain water losses of about 0.4 million gallons per year will also be eliminated. The new landscape plan will ensure that grasses are mowed up to two times per year.

The completed Project would reduce water losses at the reservoir and fountains and, hence, reduce the amount of electric power required to deliver water to the tanks. EBMUD has estimated the reduction of losses for the reservoir replacement at about 0.92 million gallons annually. Reduced electric power demands for water delivery would reduce indirect greenhouse gas emissions by about 1.32 tons per year CO_2 equivalents over the long term.

The Estates Reservoir Replacement Project would also result in less than significant impacts on global climate. According to the City of Oakland's October-November 2008 Major Project List (incorporated by reference), there are no large scale projects planned for the Project area.

However, infill and redevelopment projects may occur in the future in the City of Oakland. When viewed in combination with other reasonably foreseeable projects, implementation of the Project would result in cumulatively less than significant impacts on global climate for the following reasons:

- The demolition and construction phases of the Project are temporary sources of emissions only, lasting less than two (2) years;
- There would be no quantifiable long-term contribution of greenhouse gases from ongoing post-construction operations;
- Water and power conservation would indirectly reduce emissions of greenhouse gases over the long term. Although these reductions would be relatively small, they would nevertheless reduce cumulative impacts on global climate.

ENVIRONMENTAL IMPACT	MITIGATION MEASURES	SIGNIFICANCE AFTER MITIGATION
NOISE AND VIBRATION		
Construction Impacts **Impact 3.9-1:** Construction of the Estates Reservoir Replacement Project could generate intermittent and temporary noise above existing ambient levels	**Measure 3.9-1a:** Construction at the Estates Reservoir site will be restricted to the hours of operation consistent with the City of Oakland's Noise Ordinance (listed in Table 3.9-3) as feasible, except during critical water service outages or other emergencies and special situations. Twenty-four hour temporary pumping (at a maximum 85 dBA) would be required during upgrade of the Montclair Pumping Plant, for a period of three to six months, depending on the final work plan. ▪ Noise-generating activities greater than 90 dBA (impact construction) shall be limited to between 8:00 a.m. and 4:00 p.m., Monday through Friday, and shall be limited in duration to the maximum extent feasible. ▪ Any construction activity proposed for special activities outside of the standard hours of 7:00 a.m. to 7:00 p.m. (Monday through Friday) must be approved by EBMUD. **Measure 3.9-1b**: Measures that would be implemented to reduce noise levels during construction include, but are not limited to, the following: ▪ Truck operations (haul trucks and concrete delivery trucks) will be limited to the daytime hours listed in the Project Description (7:00 a.m.-7:00 p.m.). ▪ Best available noise control techniques (including mufflers, intake silencers, ducts, engine enclosures, and acoustically attenuating shields or shrouds) will be used for all equipment and trucks, as necessary. ▪ If feasible, the noisiest phases of construction (such as concrete breaking or concrete grinding) shall be time limited and not extended over several months. ▪ Stationary noise sources will be located as far from sensitive receptors as possible. If they must be located near receptors, adequate muffling (with enclosures) will be used. Enclosure opening or venting will face away from sensitive receptors. Enclosures will be designed by a registered engineer regularly involved in noise control analysis and design. ▪ Material stockpiles as well as maintenance/equipment staging and parking areas (all on–site) will be located as far as practicable from residential receptors. ▪ An EBMUD contact person will be designated for responding to construction-related issues, including noise. The phone number of the liaison will be conspicuously posted at construction areas, on all advanced notifications, and on the EBMUD project website. This person will take steps to resolve complaints, including coordinating periodic noise monitoring, if necessary.	Significant and Unavoidable, With Mitigation.

ENVIRONMENTAL IMPACT	MITIGATION MEASURES	SIGNIFICANCE AFTER MITIGATION
	Measure 3.9-1c: EBMUD will make a reasonable effort to limit operation of impact construction equipment during the hours of 8:00 a.m. - 4:00 p.m. by implementing the following measures for noise generating activities that may be greater than 90-dBA, including hoe rams, concrete recycling (concrete breakup, pulverizing, rear separation, crushing) and concrete pumping: ▪ If impact equipment (e.g., jack hammers, pavement breakers, and rock drills) is used during project construction, hydraulically or electric-powered equipment will be used wherever feasible to avoid the noise associated with compressed-air exhaust from pneumatically powered tools. However, where use of pneumatically powered tools is unavoidable, an exhaust muffler on the compressed-air exhaust will be used (a muffler can lower noise levels from the exhaust by up to about 10 dB). External jackets on the tools themselves will be used, where feasible, which could achieve a reduction of 5 dB. Quieter procedures, such as drilling rather than impact equipment, will be used whenever feasible. ▪ Erect temporary noise barriers or noise control blankets around the construction site, particularly along on sites adjacent to residential buildings. ▪ Utilize noise control blankets around the major noise sources to reduce noise emission from the site. ▪ Evaluate the feasibility of noise control at the receivers by temporarily improving the noise reduction capability of adjacent buildings by the use of sound blankets for example. ▪ Monitor the effectiveness of noise attenuation measures by taking noise measurements. ▪ Limit the noisiest phases of construction to 10 working days at a time, where feasible. ▪ Notify neighbors/occupants within 300 feet of project construction at least thirty days in advance of extreme noise generating activities about the estimated duration of the activity.	
Impact 3.9-2: Construction of the Estates Reservoir Replacement Project could increase noise levels along truck haul routes.	**Mitigation Measure 3.9-2:** The estimated maximum hourly noise levels would not exceed the 70-dBA speech interference criterion. Therefore short-term noise increases due to project related trucks would be less than significant. Implementation of Mitigation Measure 3.9-1.b (above) would also ensure that truck traffic noise would be less than significant.	Less than Significant

ENVIRONMENTAL IMPACT	MITIGATION MEASURES	SIGNIFICANCE AFTER MITIGATION
Impact 3.9-3: Construction of the Estates Reservoir Replacement Project could cause vibration that could disturb local residents and cause cosmetic damage to buildings and structures.	**Measure 3.9-3**: To prevent cosmetic or structural damage to adjacent or nearby structures, EBMUD will incorporate into contract specifications restrictions on construction whereby surface vibration will be limited to no more than 0.5 in/sec PPV, measured at the nearest residential or other sensitive structure. Implementation of Mitigation Measure 3.9-1c (above) will also ensure that impacts are reduced to a less than significant level.	Less than Significant
Operational Impacts **Impact 3.9-4:** Noise increases during facility operations.	**Mitigation Measure: None Required**: Long-term operation of the replacement Estates Reservoirs and refurbished Montclair Pumping Plant will not result in noise increases, over the levels currently experienced for the existing facilities. In fact, burying the replacement tanks and replacing old pumps and electrical equipment with new equipment is expected to reduce operating noise levels below what is currently experienced. (There is no record of complaints associated with operational noise at the Estates Reservoir site). Any replacement pipeline would be located underground and would not generate noise. Therefore, no further discussion of operational noise associated with pipelines, the replacement reservoirs or the refurbished pumping plant is provided.	
CUMULATIVE IMPACTS		
Visual Impact C-1: Cumulative short and long-term visual impacts	No other known projects are proposed in the immediate area or vicinity during the Estates Reservoir construction period. EBMUD will develop detailed scheduling and phasing guidelines to minimize short-term visual impacts to the surrounding area during construction of the Estates Reservoir Replacement and Montclair Pumping Plant Upgrade. In addition, the site is screened from many surrounding vantage points by intervening topography and mature vegetation. Consequently, the likelihood of any cumulative adverse visual impact on local viewsheds during construction is low.	Less than Significant
Geology Impact C-2: Cumulative geologic and seismic hazards	Since none of the projects shown in Table 5-1 are located within the area of potential impact, there would be no cumulative geologic or seismic impacts.	Less than Significant
Biological Resources **Impact C-3:** Cumulative loss of habitat for special-status wildlife and plants	As noted in Table 5.1, the Projects listed in proximity to the Project site are infrastructure improvement projects, located on already developed sites or in urban areas. Therefore, the proposed Project would not contribute to cumulative impacts to biological resources.	Less than Significant

ENVIRONMENTAL IMPACT	MITIGATION MEASURES	SIGNIFICANCE AFTER MITIGATION
Cultural Resources **Impact C-4:** Cumulative increase in cultural resource impacts	As described in Chapter 3, the Project would permanently eliminate a historic resource recommended for CRHR listing, and would have a significant and unavoidable impact to cultural resources even after mitigation (recording and documenting the roof and features). Therefore the Project would contribute to cumulative cultural resources impacts for the City of Oakland specifically, and for Alameda County and the State of California, secondarily.	Less than Significant
Traffic and Circulation **Impact C-5:** Cumulative traffic and roadway disruptions.	There are a number of approved and pending projects in the City of Oakland, as detailed on the City of Oakland's October-November 2008 project list that could potentially increase traffic in the study area. Traffic from those projects in combination with traffic from the proposed Project could result in cumulative traffic impacts. Prior to construction, EBMUD will coordinate with the appropriate departments of the surrounding jurisdictions and with other utility districts and agencies regarding the timing of construction projects that would occur near the Estates Reservoir site. Such coordination would help to minimize multiple traffic and circulation disruption in the same areas. EBMUD would also submit plans related to, and comply with the requirements of, encroachment permits with local jurisdictions (if required) which would provide further opportunities to coordinate multiple projects. Specific measures to mitigate significant impacts would be determined as part of the interagency coordination. Upon completion of the Project, traffic generated by site construction activity would return to current levels; thus the cumulative traffic impact is less than significant. Similarly, while excavation activities for the Project could generate perceptible vibration levels, implementation of mitigation measures (3.9-3) would reduce those impacts to a less than significant level. The distant location of other projects and uncertain construction timing also suggests that the potential for cumulative vibration impacts would be remote to non-existent.	Less than Significant

ENVIRONMENTAL IMPACT	MITIGATION MEASURES	SIGNIFICANCE AFTER MITIGATION
Air Quality Impact C-6: Cumulative construction emissions	As discussed in Section 3.7, the Project would not impede the State's ability to meet its 2020 greenhouse gas emissions goal. Implementation of specific measures to reduce GHG from fuel combustion, in addition to diesel exhaust control measures (Air Quality) would reduce and sequester GHG associated with vehicles and equipment use. On-going maintenance activities would remain the same, and permanently eliminating water use by the fountains would also save water and electricity used to operate the fountain pumps. For these reasons, the Project would result in less than significant cumulative impacts on global climate change.	Less than Significant
Noise and Vibration Impact C-7: Cumulative construction noise impact**s**	As noted in Table 5.1, the distant location of other projects and uncertain timing of construction suggests that the potential for cumulative noise impacts would be remote to non-existent. EBMUD will coordinate with the appropriate departments of the surrounding jurisdictions and with other utility districts and agencies regarding the timing of construction projects that would occur near the Estates Reservoir site. With early and on-going coordination, EBMUD would avoid conflicts with other projects to the extent possible, and the Project's contribution to cumulative construction noise and vibration impacts, as mitigated, would not be considered significant.	Less than Significant

S.5 Analysis of Project and Design Alternatives

Several project alternatives were developed and evaluated based on the ability to reduce seismic hazard, improve water quality, and improve operational reliability, flexibility and redundancy, as well as to reduce costs. Screening of alternatives also included project construction considerations such as site access, project staging, and construction schedule as well as the potential to generate impacts to key environmental factors analyzed in this EIR. A detailed analysis of the Project Alternatives is contained in Chapter 4 of this EIR.

The alternatives considered in this EIR include:

- Reservoir rehabilitation and replacement alternatives at the Dingee, Estates and/or Piedmont Reservoir sites; i.e., Alternatives to the Project.
- Concept design alternatives for replacement storage at the Estates Reservoir site; i.e., Alternatives of the Project.
- No Project Alternative.

Project Alternatives

Alternatives to the Project include the Pressure Zone Planning Program Alternative, the original project outlined in the Central Oakland Hills Cascade Pressure Zone Planning Program (construction of smaller tanks at the Piedmont and Estates Reservoir sites). Alternative 1, is Rehabilitation of the existing Estates and Dingee open-cut reservoirs. Alternative 2, the Proposed Project, includes construction of two replacement tanks at Estates Reservoir. Alternative 3 is construction of replacement tanks at Dingee Reservoir. Alternative 4 is construction of replacement tanks at Dingee, Estates and Piedmont reservoir sites. A No Project Alternative was also analyzed.

Alternative 2 was selected as the preferred project because it will resolve the problem of excess storage in the Dingee Pressure Zone, meet operational needs at a competitive cost (by consolidating storage at one site), and resolve seismic concerns by removing the Estates Dam embankment. The other project alternatives were eliminated based on the inability to meet the Project's basic objectives and further reduce the potential for environmental impacts; they also involve construction at multiple sites and for a longer duration.

Alternatives of the Project

Five concept design options were developed, reflecting three concept categories or themes, i.e., preservation, adaptive reuse and complete alternation. Selection criteria include construction cost and logistics, disposal or reuse of existing materials, fountain maintenance and water consumption, seismic stability, import/export traffic impacts, and visual impacts or enhancement to the surrounding community. Based on public input, the preservation or reuse of site architecture, including fountain structures, was determined to be costly and less attractive.

The selected design option (Option 4) involves a complete alteration of the site, including removal of the existing reservoir roof and supporting structure. This design is the most cost efficient and aesthetically pleasing as the replacement tanks will be covered with soil and planted with natural grasses while the west-facing walls will be incorporated into a curved landscape wall. Option 4 also minimizes traffic and truck trips, provides natural views from Estates Drive, improves distant views towards the San Francisco Bay, and improves site safety and walking trails.

S.6 Issues Raised During Public Outreach/Notice of Preparation Scoping Review Period

EBMUD has conducted five community meetings to date, to discuss the Project and to solicit public input. Appendix A of this Draft EIR presents a description of public outreach efforts to date. These meetings provided direction for the scope of effects to be considered in the EIR.

A variety of issues and concerns have been raised in response to the community outreach process, including issues related to public safety and fire protection, noise, historic/cultural resources, visual resources, traffic and circulation, and air quality. These issues were considered during preparation of the Draft EIR, and constitute the core analysis. A comprehensive list of community questions and EBMUD responses raised at each of the five public outreach meetings conducted by EBMUD between September 2007 and June 2008 is contained in the Concept Design Process and Recommendations Report for Estates Reservoir prepared by Royston Hanamoto Alley and Abey (RHAA), 2008 (updated 2009).

The initial step in the EIR process was to issue a Notice of Preparation (NOP) for the Project. The NOP was published on August 13, 2008 and the 30-day review/comment period expired on September 15, 2008. An agency meeting for the Project was held at EBMUD Administration Center and Business Office in Oakland on August 27, 2008. The purpose of the meeting was to present the Project to interested parties and resource, trustee and local agencies, and to solicit input as to the scope and content of the EIR. No comments were submitted by close of the NOP period. The NOP is attached as Appendix B.

S.7 Resources Not Evaluated Further in the EIR

Pursuant to Section 15128 and 15083 (a) of the CEQA Guidelines, this EIR shall analyze only those effects identified as potentially significant in the Initial Study prepared for this Project. These effects include: Aesthetics; Biological Resources; Cultural Resources; Noise; Air Quality; Geology/Soils, and Transportation/Traffic.

Effects found to not be significant and excluded from this EIR include: Hazard/ Hazardous Materials; Public Services; Utilities/Service Systems; Agricultural Resources; Recreation; Population/Housing; and Land Use/Planning.

The Initial Study prepared for this Project is included in this EIR as Appendix C.

S.8 Organization of EIR

This Draft EIR has been organized into the following chapters:

1. **Introduction.** This chapter discusses the CEQA process and the purpose of the EIR.

2. **Project Description.** This chapter provides an overview of the Estates Reservoir Replacement Project, describes the need for and objectives of the Project, and describes in detail the proposed project design, construction, and operating characteristics.

3. **Environmental Setting, Impacts, and Mitigation Measures.** This chapter presents a description of the physical and regulatory setting of the Estates Reservoir Replacement Project, describes impacts that could result from implementation of the Project, and identifies measures to mitigate those impacts. This chapter is divided into environmental issue areas consistent with the Initial Study (Appendix B) but also addresses greenhouse gases/climate change. In order of occurrence, the resource sections addressed include:
   - Visual Quality
   - Geology, Soils and Seismicity
   - Biological Resources
   - Cultural Resources
   - Transportation/Traffic
   - Air Quality
   - Greenhouse Gases/Climate Change
   - Noise and Vibration

4. **Analysis of Alternatives.** This chapter presents an overview of the alternatives development and evaluation process including Alternatives to the Project and Alternatives of the Project.

5. **Cumulative Impacts, Growth Inducement and Other Topics Required by CEQA.** This chapter identifies and describes other EBMUD projects, as well as projects proposed by other entities, that could contribute to significant cumulative impacts; it also indicates the potential for implementation of the Estates Reservoir Replacement Project, in combination with other projects in the vicinity, to contribute to significant cumulative impacts. This chapter also discusses the impact that the Estates Reservoir Replacement Project could have on growth inducement, population and housing.

6. **Report Preparers.** This chapter identifies those involved in preparing this Draft EIR.

Chapter 1
Introduction

1.1 Purpose of the EIR

East Bay Municipal Utility District (EBMUD), as the lead agency, has prepared this Draft Environmental Impact Report (EIR) for the Estates Reservoir Replacement Project in compliance with California Environmental Protection Agency (CEQA) Statutes[1] and the CEQA Guidelines[2]. The EIR is a public document for use by governmental agencies in identifying and evaluating the potential environmental consequences of a project, recommending mitigation measures to lessen or eliminate adverse impacts, and examining feasible alternatives to the Project. The impact analyses in this report are based on a variety of sources; references for these sources are listed at the end of each technical section. The information contained in this EIR and public comments on the content of this EIR will be reviewed and considered by EBMUD Board of Directors prior to the ultimate decision to approve, disapprove, or modify the proposed Project.

1.2 CEQA EIR Process

1.2.1 Public Scoping/Notice of Preparation (NOP)

EBMUD has conducted five community meetings to date, to discuss the Project and to solicit public input. Appendix A of this Draft EIR presents a description of public outreach efforts to date. These meetings provided direction for the development of alternatives and the scope of effects to be considered in the EIR.

A variety of issues and concerns have been raised in response to the community outreach process, including public safety and fire protection, noise, historic/cultural resources, visual resources; traffic and circulation, and air quality. These issues were considered during preparation of the Draft EIR, and constitute the core analysis. A comprehensive list of community questions and EBMUD responses raised at each of the five public outreach meetings conducted by EBMUD between September 2007 and June 2008 is contained in the *Concept Design Process and Recommendations Report for Estates Reservoir* prepared by Royston Hanamoto Alley and Abey (RHAA), 2008 (updated 2009).

In accordance with Sections 15063 and 15082 of the CEQA Guidelines, EBMUD prepared an NOP for this EIR. The NOP provided a general description of the proposed Project, a review of the proposed project location, and a preliminary list of potential environmental impacts. The NOP was published on August 13, 2008 and the required

[1] *Public Resources Code 21000-21177.*
[2] *California Code of Regulations, Title 14, Division 6, Chapter 3, Sections 15000-15387.*

30-day review/comment period expired on September 15, 2008. An agency meeting for the Project was held at EBMUD Administration Center and Business Office in Oakland on August 27, 2008. The purpose of the meeting was to present the Project to interested parties and resource, trustee and local agencies, and to solicit input as to the scope and content of this document. No comments were submitted by close of the NOP period.

The NOP is attached as Appendix B.

1.2.2 Resources Not Further Evaluated in This EIR

Section 15128 of the CEQA Guidelines addresses Effects Not Found To Be Significant.

"An EIR shall contain a statement indicating the reasons that various possible significant effects were found not to be significant and were therefore not discussed in detail in the EIR. Such statement may be contained in an attached copy of an initial study."

Section 15083 Early Public Consultation

"(a) Scoping has been helpful to agencies in identifying the range of actions, alternatives, mitigation measures, and significant effects to be analyzed in depth in an EIR and in eliminating from detailed study issues found not to be important."

Pursuant to Section 15128 and 15083 (a) of the CEQA Guidelines, this EIR shall analyze only those effects identified as potentially significant in the Initial Study prepared for this Project. These effects include: Aesthetics; Biological Resources; Cultural Resources; Noise; Air Quality; Geology/Soils and Transportation/Traffic. In addition, to meet state requirements to consider greenhouse gas contributions to potential climate change, an analysis of the Project's greenhouses gas emissions and potential to contribute to global warming is included in this EIR.

Effects found to not be significant and excluded from this EIR include, Hazard/ Hazardous Materials; Public Services; Utilities/Service Systems; Agricultural Resources; Recreation; Population/Housing; and Land Use/Planning.

The Initial Study prepared for this Project is included in this EIR as Appendix C.

1.2.3 Draft EIR

This Draft EIR will be made available to local, state, and federal agencies and to interested organizations and individuals who may want to review and comment on the report. Notice of the Availability of this Draft EIR will also be sent directly to every agency, person, or organization that commented on the NOP (none) or requested to be informed of project activities during the five public outreach meetings.

The publication of the Draft EIR typically marks the beginning of a mandatory 45-day public review period. However, EBMUD will be providing a 60-day review period.

During the 60-day review period, written comments should be mailed or hand delivered to:

Gwen Alie, Associate Planner
East Bay Municipal Utility District
375 Eleventh Street (Mail Slot 701)
Oakland, CA 94607-4240
galie@ebmud.com

1.2.4 Final EIR

Written and oral comments received on this Draft EIR will be addressed in a Response to Comments document that together with this Draft EIR, will constitute the Final EIR. The Response to Comments document will also stipulate any changes to the Draft EIR resulting from public and agency input.

The EBMUD Board of Directors will consider certification of the Final EIR at a regularly scheduled Board meeting in December 2009 or January 2010, adopting findings concerning its feasibility and environmental merits based on the contents of this EIR and the administrative record. Upon certification, EBMUD may proceed with project approval actions, including design and construction of the Project.

CEQA requires that the lead agency neither approve nor implement a project without determining whether the project's significant environmental effects have been reduced to a less than significant level, essentially "eliminating, avoiding, or substantially lessening" the expected impacts. If the lead agency approves the project with any residual significant adverse impacts that cannot be mitigated to a less than significant level, the agency must state the reasons for its action in writing. This Statement of Overriding Considerations must be included in the record of project approval.

1.2.5 Mitigation Monitoring and Reporting

State law requires lead agencies to adopt a Mitigation Monitoring and Reporting Program (MMRP) for those changes to the project that have been adopted or made a condition of project approval in order to mitigate or avoid significant effects on the environment. The CEQA Guidelines do not require that the specific reporting or monitoring program be included in the EIR. However, throughout this EIR, proposed mitigation measures have been clearly identified and presented in language that will facilitate establishment of a monitoring program. Furthermore, comments received during the public review period on the mitigation measures and their implementation will also be considered for inclusion in the MMRP. All adopted measures will be included in a mitigation monitoring and reporting program for EBMUD to verify compliance through the project Design, Construction and Maintenance phases.

Chapter 2
Project Description

2.1 Overview

The Estates Reservoir Replacement Project is part of a planned system of improvements located in East Bay Municipal Utility District's (EBMUD) Oakland Hills service area (south of Highway 24 north of the Oakland/San Leandro border). The Project is designed to improve water quality and increase system reliability and operating efficiency by removing excess, inefficient storage and aging facilities requiring major rehabilitation or replacement. Reducing the amount of distribution storage in the Dingee Pressure Zone (currently served by both Estates and Dingee Reservoirs) will also improve the water quality in the higher elevation pressure zones supplied from the Dingee Pressure Zone.

The Project includes the replacement of the existing terraced Estates reservoir roof (including one planter and two fountains), and the removal of an embankment dam and open-cut, below grade reservoir. In its place, EBMUD will construct two buried concrete tanks incorporated into a comprehensive landscape plan. A conceptual landscape plan was developed with community input and addresses the visual/aesthetic impacts associated with proposed changes to the site. The Dingee Reservoir will be decommissioned once the replacement Estates tanks are in-service.

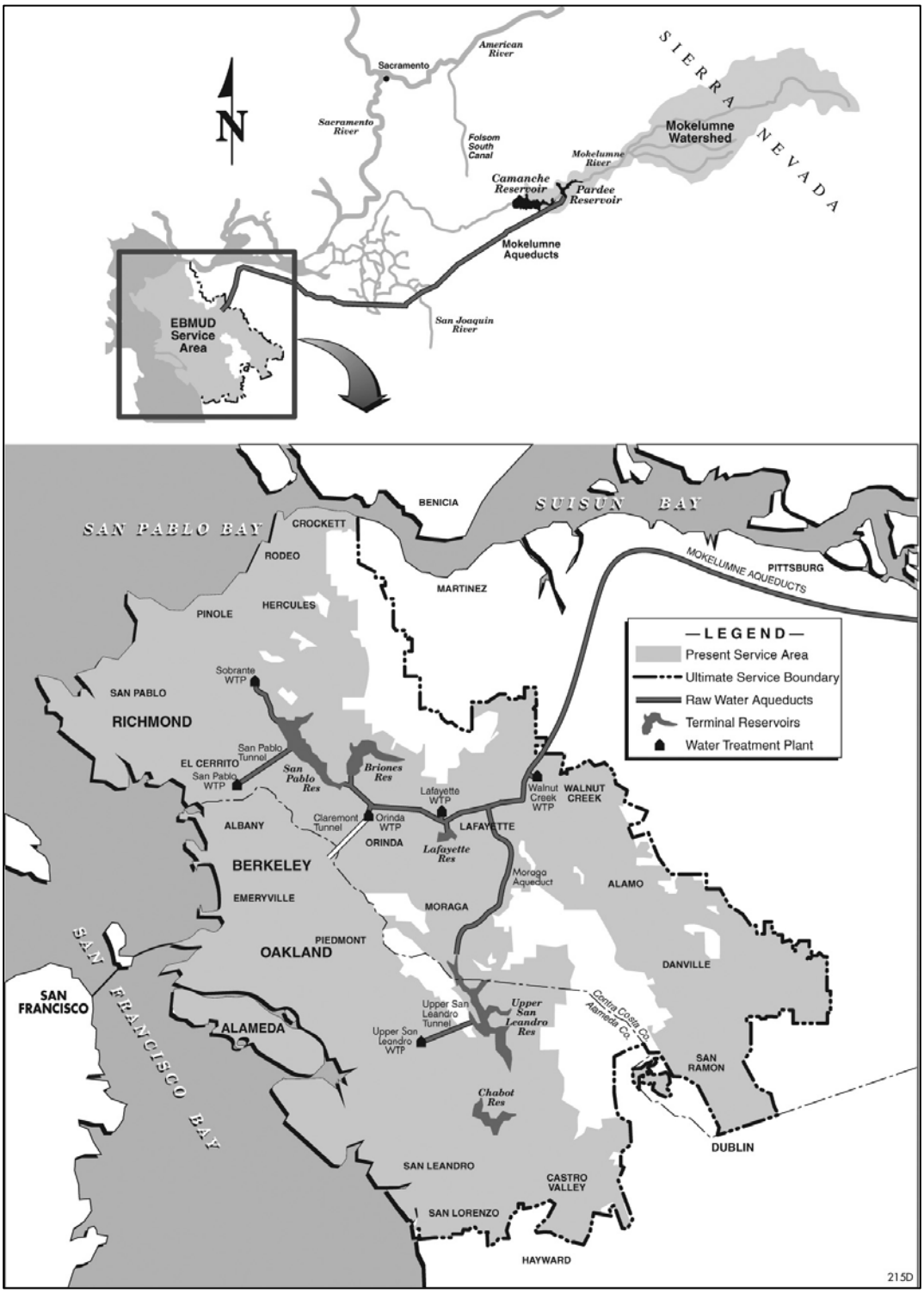
Construction activities involve the demolition of the existing open-cut reservoir followed by the construction of two cylindrical 3.3-million gallon (MG) buried concrete tanks with landscaping and associated appurtenances. A comprehensive landscape plan with varied plants, an architecturally detailed landscape wall, and contouring of the site will be implemented to create a new and pleasing aesthetic environment. In response to EBMUD's Vulnerability Assessment Program-Security Upgrades, the existing chain-link security fence along the site perimeter will be replaced, at the same location. The fence height will increase from six to eight feet, and the mesh size will change from two to one inch. The fence color will remain the same (black).

The Project also includes an upgrade to the electrical and mechanical facilities at the adjacent Montclair Pumping Plant, located below the reservoir embankment. No changes to the pumping plant structure are proposed.

2.2 Project Need and Objectives

2.2.1 Project Background

Service Area. EBMUD's water distribution system overall provides water service to 20 incorporated cities and 15 unincorporated areas in Alameda and Contra Costa Counties (**Figure 2-1**, East Bay Municipal Utility District Service Area).



Source: EBMUD 2008

East Bay Municipal Utility District Service Area
Figure 2-1

Water Supply

EBMUD's primary water source is the Mokelumne River. The Mokelumne River watershed is on the west slope of the Sierra Nevada and is generally contained within national forest or other undeveloped lands. Mokelumne River water is stored at the Pardee and Camanche Reservoirs, about 90 miles east of the Oakland Area.[3] Water from Pardee Reservoir is conveyed to EBMUD's service area and terminal storage via the three Mokelumne Aqueducts. The three Mokelumne Aqueducts, constructed between 1925 and 1963, begin at the Pardee Tunnel (in Campo Seco) and terminate about 90 miles to the west, at the Lafayette Aqueducts in Walnut Creek.

Water Treatment

EBMUD operates six water treatment plants (WTP), four of which supply the West of Hills area serving more than 800,000 people. **Figure 2-2** depicts the service area boundaries for the WTPs based on summer demand conditions:

- Orinda WTP **(**1935) serves the West of Hills service area[4] and the Estates Reservoir Project area via the Claremont Tunnel, and to the East of Hills service area via the Los Altos Pumping Plant.

- Sobrante WTP (1965) serves the northern part of the service area (Pinole, Hercules, Richmond, El Sobrante, Rodeo, and Crockett).

- Upper San Leandro WTP (1927) serves the southern part of the service area (south Oakland, San Leandro, and Castro Valley).

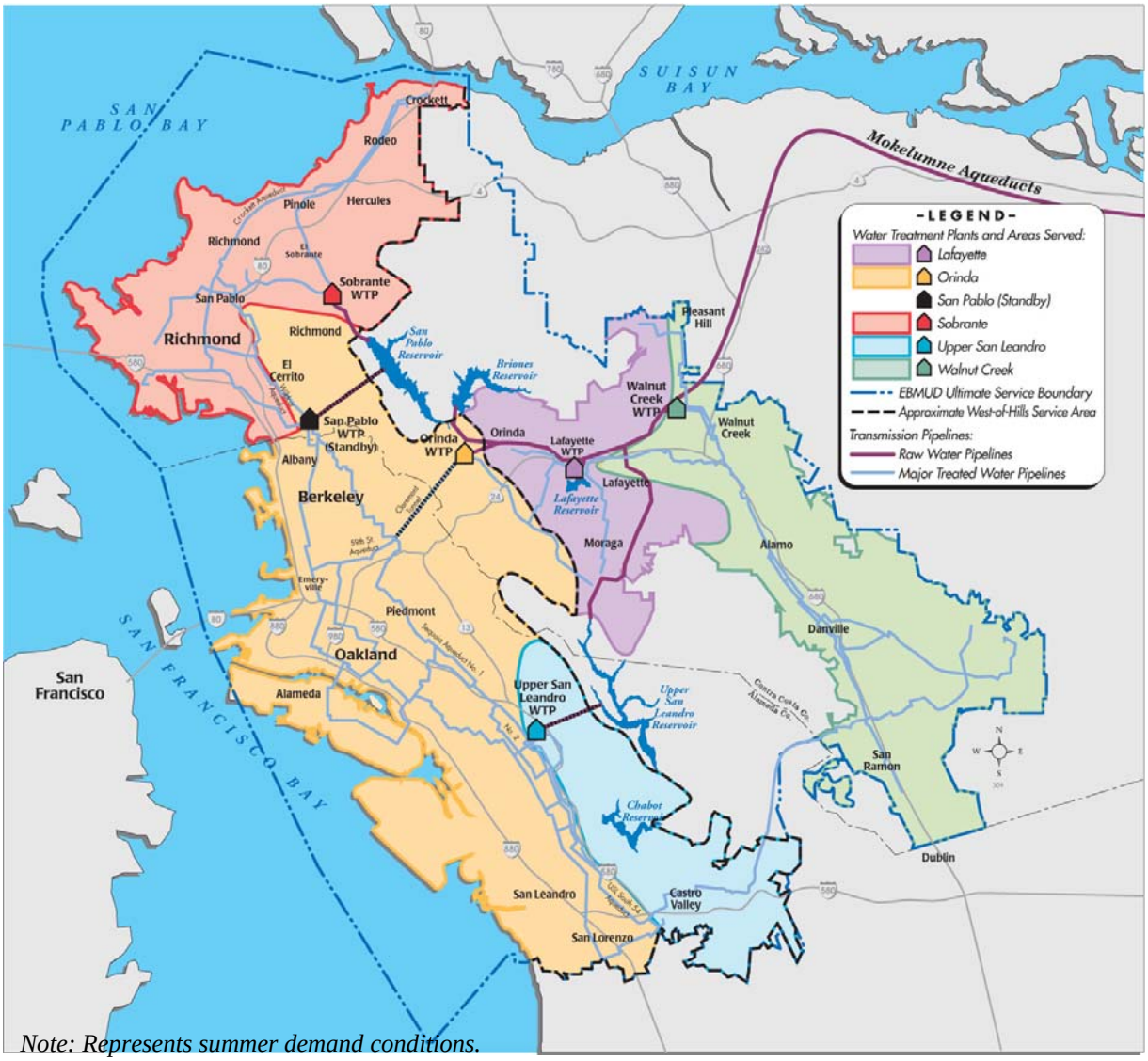
- San Pablo WTP (1921) is not used on a regular basis, and supports outages, repairs, and upgrades of other facilities, when they are taken out of service for inspection.

- Walnut Creek WTP (1967) serves almost all EBMUD customers in the south-central Contra Costa County area (Walnut Creek/San Ramon Valley area).

- Lafayette WTP (1953) serves the central part of EBMUD service area, including Lafayette, Moraga, and parts of Orinda and Walnut Creek.

[3] Camanche Reservoir stores water for irrigation and stream-flow regulation, providing flood control and water to meet the needs of downstream water rights holders]

[4] Walnut Creek WTP and Lafayette WTP supply water to the eastern portion of EBMUD service area only



Note: Represents summer demand conditions.

Source: EBMUD 2008

Existing Water Treatment Plant Service Area
Figure 2-2

Water Distribution

In addition to water supply and treatment facilities, there are over 4,000 miles of potable (treated water) distribution and transmission pipes, 16 tunnels, 175 potable water reservoirs, 130 pumping plants, and numerous other facilities that together provide water service to EBMUD's customers.

Estates Reservoir, shown in the vicinity/location map in **Figure S-1**, was originally constructed in 1903 and raised to its present height and lined with concrete in 1938. The reservoir was formed by excavating a basin (i.e., open-cut) at the head of a small ravine into the existing bedrock and constructing an earth fill dam at the west side. A roof was installed in 1968 to help maintain the quality of the treated water, and in anticipation of

more stringent water quality regulations. The roof system is supported by concrete columns and timber framing. Architectural elements were incorporated into the roof built in the 1960s including terraces, two large water fountains and one planter box. Water supply to the fountains was turned off in June 2008 in response to EBMUD's May 2008 Board Resolution declaring a water shortage emergency and adopting the 2008 to 2009 Drought Water Management Program.

Estates Reservoir is one of more than 20 EBMUD open cut reservoirs, most of which fall under the regulatory jurisdiction of the State Division of Safety of Dams (DSOD). EBMUD regularly inspects these facilities in coordination with DSOD staff to monitor, and if necessary, correct issues that could potentially impact the integrity of the reservoir embankments. Identified maintenance repairs are given a high priority.

Dingee Reservoir, also shown in **Figure S-1**, was originally constructed in 1894 and was modified twice, once for the construction of a new roof and lining (1931), and again for the construction a new curb which now parallels Estates Drive (1939). The dam is composed of fill, and cut into existing bed-rock material, but is not under the jurisdiction of DSOD. No other major improvements have been performed since 1939. Dingee Reservoir is located about a tenth of a mile from Estates Reservoir on Bullard Drive.

Dam Safety Program

EBMUD owns and manages 31 dams as part of its water system. EBMUD's reservoir dams were built from the late 1800s to the late 1960s. EBMUD engineers inspect each dam monthly. The larger dams under jurisdiction of the DSOD are also inspected annually by the State of California. EBMUD periodically conducts an extensive seismic study of its dams.

EBMUD is in the process of evaluating each of these reservoirs and replacing them with tanks as appropriate. Resizing is needed to meet water quality requirements and to more efficiently manage the EBMUD water distribution system. In addition, tanks can be built to remain serviceable after an earthquake with greater reliability with reduced maintenance costs, and provide better water quality. As a result of the reservoir resizing program, the number of dams owned and managed by EBMUD will decrease in future years.

Estates Reservoir is one of the facilities being replaced through this program, for the reasons cited above.

2.2.2 Project Purpose and Objectives

Dingee Pressure Zone improvements are being addressed as part of a broader Oakland Hills Pressure Zone Improvements Study aimed at improving water quality and system reliability by removing excess/inefficient storage and rehabilitating or replacing aging facilities. Principal storage in the Dingee Pressure Zone is currently contained in Dingee

and Estates Reservoirs with a service elevation (pressure zone) between 500 feet and 675 feet. The northern portion of the Piedmont Pressure Zone is also supplied via the Dingee Pressure Zone through the existing Piedmont Regulator, located at the Piedmont Reservoir site, off Blair Avenue.

The proposed improvements address long-standing water quality and seismic safety issues. Water age is a significant concern with reservoirs that have storage capacities in excess of their service area peak water demand. Shorter storage time and higher reservoir turnover rates reduce the need for high disinfectant concentrations in the drinking water. The majority of the large, open cut reservoirs are planned to be downsized to smaller capacity tanks for this reason.

Water quality in the Dingee Pressure Zone is sub-optimal due to the large storage volume versus low water demands which results in water aging and disinfectant dissipation. This water quality issue is exacerbated in the pressure zones located above Dingee Pressure Zone as a result of continued water aging. Removal of excess water storage within Dingee Pressure Zone by downsizing the reservoirs will significantly improve water quality within and above the Dingee Pressure Zone.

The Estates Reservoir embankment does not meet DSOD's recommended seismic requirements. To address this, the 17.6-MG Estates Reservoir is currently operating at a reduced capacity of about 13.4-MG. Dingee Reservoir is not under DSOD jurisdiction but is seismically inadequate, and would need new roofing and lining improvements if maintained. The existing roof structures of both Estates and Dingee Reservoirs do not meet current seismic standards.

Dingee Reservoir, a 4.2-MG open-cut reservoir bound by Estates and Bullard Drives in Oakland, was recently studied with regard to both static and seismic performance as part of EBMUD's ongoing dam safety program. The seismic safety analysis shows that the dam at Dingee will perform satisfactorily when subjected to ground shaking from the maximum credible earthquake magnitude 7.25 on the Hayward Fault. The results also indicate about two feet of slope deformation and less than one foot of crest settlement, as well as satisfactory performance of the upstream slope of the dam in case of rapid reservoir drainage. There are no known fault traces at the site. No improvements are proposed for the Dingee Reservoir, and it will be placed out of service once the replacement Estates Reservoirs are constructed and in-service.

The objectives of the Estates Reservoir Replacement Project are summarized as follows:

- Resolve distribution system issues including poor water quality due to excess volume in the Estates and Dingee Reservoirs
- Replace inefficient storage in the pressure zone with optimal sites from a hydraulic and cost perspective
- Replace aging distribution facilities (storage and pumping) in the pressure zone
- Address seismic deficiencies at the dam foundation

- Maintain an acceptable and pleasing aesthetic site environment comparable to the notable existing roof architecture

2.3 Project Location

Estates Reservoir is located on a 6.7 acre parcel of land on the south side of 6317 Estates Drive (between Moraga Road and Park Boulevard) in the City of Oakland. The reservoir is situated on the western slope of a ridge west of Highway 13. There are approximately twelve home sites that overlook the reservoir site. Existing bushes along with pine, redwood, and eucalyptus trees line the Estates Drive frontage to shield views of the reservoir roof from many neighborhood homes. Rows of redwood trees, located on the downstream embankment, line the western portion of the property. The Montclair Pumping Plant is located on the same parcel as the reservoir, but at the base of the vehicle access road on the south or downstream side of the reservoir embankment. **Figure S-1** also shows the location of Estates Reservoir, Montclair Pumping Plant and the nearby Dingee Reservoir as well as the major travel routes and proximity to the Warren Freeway (State Highway 13).

2.4 Project Characteristics

The Estates Reservoir Replacement Project includes the replacement of the existing open-cut storage at the Estates Reservoir site and an upgrade to the adjacent Montclair Pumping Plant. The Estates Reservoir Replacement Project will 1) improve water quality by downsizing and consolidating the amount of storage in the Dingee Pressure Zone, and 2) enhance system flexibility by improving operational flexibility and redundancy. The pumps, motors and electrical system at the Montclair Pumping Plant date back to the 1940s and 1950s, and need to be replaced with more energy efficient units of the same capacity.

The Project involves the demolition of the existing open-cut reservoir structure followed by the construction of two circular 3.3-MG buried concrete tanks with landscaping and associated appurtenances. **Figure S-2** (page S-4) shows the proposed site plan for Estates Reservoir, and corresponding profiles and cross-sections. Each tank has an inside diameter of about 138 feet with a bottom elevation of 738 feet and overflow elevation of 770 feet. The access road will extend across the lowered dam embankment down to a new valve pit structure which serves both tanks. Subject to DSOD approval, the existing embankment will be breached with drainage piping to prevent water ponding in the existing basin. Improvements at the Montclair Pumping Plant include upgrades of the existing pumps, motors and related appurtenances which will occur within the existing structure. No additional pumping plant capacity is required at this facility. During the plant upgrade, temporary exterior pumps will likely be required to maintain system operations.

Demolition of the existing fountains and roof structure will include removal of the supporting timbers, concrete planter, concrete reservoir basin lining, and a portion of the

reservoir embankment. Most of the structural concrete will be recycled and incorporated into the proposed landscape plan, while soil removed from the embankment will be incorporated into the proposed grading/landscape plan. The bulk of the existing roofing material, plywood sheathing, and timber framing system cannot be reused on-site.

The replacement tanks will be mostly buried as an integral part of the overall landscape design. The site will be landscaped with a mixture of native grasses, shrubs, and trees as shown in the elevated views of the landscape plans shown in **Figure 2-3**. An improved (looped) pedestrian path will be added. Existing bushes along the perimeter will also be thinned while the lower branches of existing trees will be pruned (an on-going effort) to address fire prevention and security concerns, and to expand public views into and across the site. The existing vehicular access point to the site from Estates Drive will be maintained. New interior parking for EBMUD vehicles and equipment will be provided in two areas which will be screened to the extent feasible. In response to EBMUD's Vulnerability Assessment Program-Security Upgrades, the existing chain-link security fence along the site perimeter will be replaced, at the existing location. The fence height will increase from six to eight feet, and the mesh size will change from two to one inch. The fence color will remain the same (black).

During construction at the Estates Reservoir site, water service to the Dingee Pressure Zone will be provided by the existing Dingee Pumping Plant located about two miles to the north near Chabot Park and the existing Dingee Reservoir located nearby on Estates Drive. Upon completion of the Estates Reservoir Replacement Project, the Dingee Reservoir will be drained and permanently placed out of service. No improvements are planned for Dingee Reservoir.

EBMUD considered alternative facility arrangements involving various reservoirs, regulators and pumping plants. The proposed Project addresses seismic concerns with the embankment, meets EBMUD's operational needs at a reasonable cost, and also provides visual mitigation related to removing the roof structure and features built in the 1960s. Key components of the proposed Project include:

- Removing the 2.8-acre reservoir roof and timbers, and dismantling the two fountains and concrete planter.
- Removing the 4-inch reinforced concrete reservoir liner which encases the existing reservoir basin.
- Reducing the height of the earthen embankment by approximately 25 feet in order to provide a portion of the fill required for the proposed landscape plan.
- Recycling demolition materials, particularly the concrete floor liner and concrete support columns, as fill other than structural backfill.
- Disposing of roof timber, roofing material, plywood sheathing, and timber framing system at an approved disposal site.
- Constructing two 3.3-MG concrete tanks; these reservoirs will be mostly buried with the south-west facing wall of the tank incorporated into an architectural landscape wall. Burying and backfilling the tanks with recycled demolition materials will also reduce the amount of fill imported to the site.

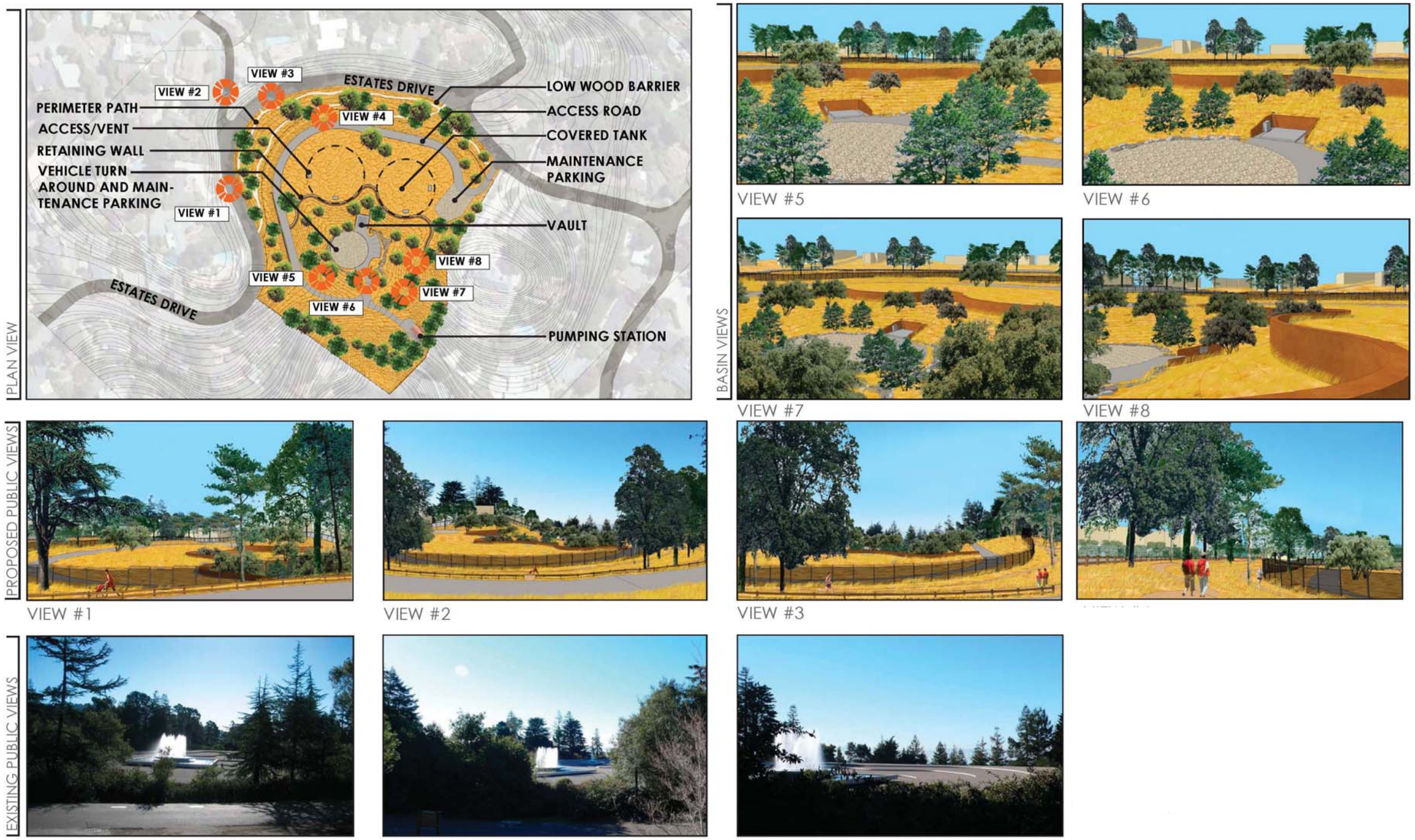
- Landscaping the reservoir basin, with a mixture of native grasses, shrubs and trees, to create a low-maintenance park-like setting; the tops of the reservoirs will be planted with grass to ensure consistency with the overall landscape/visual design.
- Improving an existing path along the Estates Drive frontage for pedestrian use.
- Replacing the existing security fence around the site perimeter.
- Improving interior parking facilities for EBMUD vehicles.
- Upgrading the existing pumps and motors at the Montclair Pumping Plant including the instrumentation, motor control centers, transformers and related appurtenances located within the existing plant.
- Replacing the existing chain-link security fence along the site perimeter, at the existing location. The fence height will increase from six to eight feet, and the mesh size will change from two to one inch. The fence color will remain the same (black).

2.4.1 Design Characteristics and Potential for Recycling

The site plan for the proposed Project incorporates the cylindrical pre-stressed-concrete tanks into the landscape by covering the structures with soil and planting grasses over the top to blend in with the overall theme. About 22,000 cubic yards of the estimated 28,000 cubic yards of fill needed to implement the grading plan will be available on-site by lowering the existing embankment about 25 feet; 4,500 cubic yards will be imported by trucks. Recycling the structural concrete on-site could potentially offset or reduce the amount of import fill (an estimated 1,600 cubic yards available in the 120,000 square feet of 4-inch concrete lining, 300 cubic yards in the pre-stressed concrete columns and 500 cubic yards in the fountain and planter structures), to approximately 2,100 cubic yards.

Demolition of the existing roof structure may also provide the opportunity for recycling of some materials such as the metal pipe and roof flashing, while the roofing materials include gravel, waterproof membrane, plywood and Douglas fir framing and support structure. The waterproof membrane and asphalt impregnated rock may be difficult to remove from the treated plywood sheathing, and thus may not be recyclable. Some of the gravel may be recycled for drainage.

The plywood sheathing and all Douglas fir framing members (glu-lam beams, girders and joists) are treated with pentachlorophenol, a wood preservative. As a waste product, the treated wood is subject to Regulations for the Management of Treated Wood Waste issued by the California Department of Toxic Substances Control, and must go to a designated treated wood waste landfill such as Keller Canyon where it would be treated as Special Waste. The regulations state that treated wood waste may only be reused at its original site and in the same manner as its original use. There are approximately 463,000-board feet of treated lumber and 150,000-square feet of plywood in the reservoir roof which will require handling, on-site storage, transportation and disposal in accordance with the regulations. Due to State regulations, there appears to be little, if any, potential for reuse of the treated wood on site.



Elevated Views of the Landscape Plan
Figure 2-3

The roof framing of the reservoir is primarily supported on pre-stressed reinforced concrete columns, approximately 12 inch by 12 inch square and 6 feet to 37 feet in length. The concrete columns may be reused where feasible, and recycled by removing them from their bases, breaking up the concrete, extracting the rebar for recycling and reusing the concrete rubble for landfill on site. The roof at the reservoir perimeter is supported on wood framed walls with plywood wall sheathing. This wood used is also pressure treated and requires the same handling and disposal as the roof. The existing metal louvers and access doors located in the reservoir side wall may be recycled as scrap metal or salvaged for reuse; metal roof flashing could also be recycled. The 4-inch thick concrete lining along the bottom and sides of the existing reservoir will be recycled as fill material; any steel or rebar would be hauled off-site and recycled.

The existing fountain and planter structures are made of reinforced concrete and pre-cast concrete elements supported on 14- and 16-inch square concrete columns. These structures may be broken up and recycled on-site, similar to the concrete liner and columns. Miscellaneous materials on site include low rock and concrete walls at the reservoir's perimeter, asphalt paving, and concrete vault and overflow structures. Asphalt can also be ground and recycled on or off site. Plumbing, fencing, electrical and mechanical materials can also be recycled or reused off-site.

2.4.2 Construction Characteristics

Schedule, Work Hours, and Staging

Table 2.1 lists project construction activities and estimated durations for the Estates Reservoir replacement work. Listed activities are generally sequential, with some overlapping activities. For example, construction of the valve pit and piping would probably be installed in conjunction with construction of the reservoir walls. The overall project duration for the reservoir Project is estimated to be approximately two years. Delays related to weather, protection of sensitive resources, material delivery, unforeseen underground conditions or other factors could add additional time

The Montclair Pumping Plant Upgrade will take from three to six months to complete, and the schedule is presently undetermined. Activities associated with the pumping plant upgrade include: mobilization, installation of new switchgear, electrical control panel and motor control center, and sequential removal and replacement of pumps 1-3, with final testing. Temporary, exterior pumps will be required during the Upgrade. On-site pipeline may also be replaced.

Table 2.2 identifies material quantities used in estimating truck trips and durations related to demolition of the existing Estates Reservoir structure. Consistent with the Oakland Noise Ordinance, construction would occur between 7:00 a.m. and 7:00 p.m., five days a week (Mondays through Fridays), with after hours or weekend construction activity limited to unplanned/unexpected occurrences or critical shutdowns approved by EBMUD staff. Construction personnel would arrive on-site and depart approximately

half-hour prior to or after regular construction times. The existing site would serve as the construction staging/parking area for reservoir and pumping plant project elements. Construction staging for the reservoir replacement will primarily occur within the open cut reservoir bowl. Montclair Pumping Plant will remain in-service during the entire reservoir construction phase, therefore EBMUD personnel will need 24-hour access to the plant for operational and maintenance purposes.

TABLE 2.1
Construction Activities Associated With Estates Reservoir

Activity	**Estimated Duration** *(in weeks)*
Demolition of Estates Reservoir	
Mobilization	1
Drain Reservoir	4
Remove Gravel Roof	6
Remove Paneling	1
Remove Joists	1
Remove Girders	3
Remove Columns	3
Remove Lining	6
Subtotal for Demolition Phase	25
Construction of New Tanks and Landscaping	
Reservoir Foundations and Floor	12
Reservoir Walls	12
Reservoir Roof	9
Valve Pit and Piping, Tank Wrapping	7
Field Testing and Startup	6
Backfilling	4
Site Restoration	4
Landscaping	8
Complete Civil Work/Pave	4
Demobilization	2
Subtotal for New Construction Phase	68
Total Construction Duration	**93 weeks** *(approximately 1.8 years)*

Source: EBMUD 2009

TABLE 2.2
Estates Reservoir Demolition Quantity Estimates (Cubic Yards)

Reservoir Structure/Element	Estimated Volume	Concrete Components	Other Materials
Roofing and Gravel	375	-	375
Paneling	350	-	350
Roof Joists, Douglas Fir	175	-	175
Roof Girders, Douglas Fir	300	-	300
Pre-stressed Concrete Columns	300	300	-
Lining, 4-inch Concrete	1,600	1,600	-
Roof Fountains and Planter, Concrete	500	500	-
Total	**3,600**	**2,400**	**1,200**

Source: EBMUD 2008

Demolition at the Estates Reservoir would entail a series of steps utilizing laborers, portable pumps (for draining), generators, bull dozers, cranes, hoe rams, water trucks, haul trucks, air compressors, chain saws, concrete crushing and steel cutting equipment and hand tools.

Installation of the new tanks at Estates Reservoir would require the following tasks and equipment:

- Reservoir foundation and floor slabs – crane drill for concrete piers and rebar, concrete trucks, tractor dozer
- Reservoir walls – crane, concrete/shotcrete trucks, concrete pump, and steel cable pre-stressing machine
- Reservoir roofing – crane, concrete trucks, concrete pump
- Valve pit piping – crane, back-hoe, concrete trucks, concrete pump
- Backfilling – bulldozer, compactor, scraper, haul trucks
- Site restoration, re-vegetation, and planting – haul truck, backhoe
- Complete civil work – haul truck, backhoe, tractor/dozer
- Demobilization – haul truck, backhoe

Truck traffic to and from the site would be limited to the hours of 7:00 a.m. to 7:00 p.m., Monday through Friday, consistent with construction hours listed in the Oakland Noise Ordinance. Construction traffic to the site would vary by type of activity and construction phase. Peak truck traffic is associated with concrete deliveries for the floor or roof slab, as each pour is a one day operation. The same truck traffic peak is anticipated during the process of importing fill to complete the grading plan. During the demolition phase, total truck haul trips away from the site are expected to be less than one-half that estimated for the construction phase, but involves an equal or slighter greater amount of worker vehicle traffic than that estimated for the construction phase.

Additional traffic generation information is detailed in Section 3.6 and Table 3.6-5 of this EIR.

Construction Activities

Construction activities would also require the use of on-site power and water sources, temporary light poles, storage of petroleum products in above ground tanks (for example hydraulic fluids and lubricants); pumps, hoses and temporary pipelines to deliver water to the construction area; and water tank trucks, dust control operations and other equipment and activities (construction trailers) required to support the construction process. Excavation at shallow depths (less than about 15 feet) is expected to be accomplished using standard earthmoving equipment; depths greater than 15 feet may require the use of jack hammers, hoe rams or drilling equipment. Some equipment will be on-site for specified periods (e.g., dozers, hoe-rams and concrete breaking/crushing equipment while other equipment such as backhoes, loaders, and maintenance vehicles would be present during all construction phases. During the pumping plant upgrade, temporary, outdoor pumps will likely be utilized, until pump replacement is completed.

Fencing and Work Area Delineation

The existing permanent six-foot perimeter chain link security fence will be replaced with a taller fence of similar material and color, in same location. Temporary security fencing within the site may be required during construction to delineate work areas, but will be removed when construction is completed. An on-site construction office trailer(s) will be located near the Estates Drive entrance, inside the existing gate.

Staging and Stockpiling Activities

During the course of construction, the contractor will be required to store and stage equipment and materials (concrete forms, scaffolding, etc.) and demolition debris on-site. Stockpiles would typically be less than 40 feet in height from the bottom of the existing basin (i.e., no taller than the existing roof structure) and would be managed using erosion and dust controls to minimize dispersal of dust.

Deliveries of construction equipment, cement, drainage rock, reinforcing steel and concrete would occur throughout construction, however, the majority of the concrete deliveries are required for construction of the two tanks and the concrete landscape wall. Fueling and maintenance of construction equipment would occur daily, as required, and within the approved work hours.

2.4.3 Operating Characteristics

Instrumentation is provided to remotely operate and monitor the pumping plant and reservoir system. However the site and facilities would continue to be routinely inspected by EBMUD's Operations and Maintenance staff, EBMUD contractors and Pacific Gas and Electric Company (PG&E), and used periodically for job-site reporting by field personnel

working in the area. Long-term site maintenance involves controlling the growth of annual grasses, keeping the site clean and free of debris, and trimming shrubbery and trees to maintain clear views around and through the site for both fire prevention and public safety. The Oakland Fire Department (Fire Abatement Unit) inspects the site annually and has established specific vegetation maintenance requirements which EBMUD incorporates into and utilizes in its site maintenance program.

2.5 Project Schedule and Cost

The EBMUD Board of Directors will consider certification of this Environmental Impact Report (EIR) and approval of the Project at a regularly scheduled meeting in December 2009 or January 2010. Reservoir construction would begin as early as 2011 and be completed in 2013, based on a design/bid/award process starting in 2010. The schedule for upgrade of the Montclair Pumping Plant is 2013-2014, but construction may be deferred due to budgetary priorities.

The planning-level project cost is estimated at $15 Million for the Estates Reservoir Replacement Project and about $1.4 Million for the Montclair Pumping Plant Upgrade. This estimate includes design, construction, construction management, inspection and outage costs.

2.6 Approvals or Authorizations Required for This Project

Table 2.3 presents a preliminary list of the agencies and entities, in addition to EBMUD, that would use this EIR in their consideration of specific permits and other discretionary approvals that may apply to the Project. This EIR is intended to provide those agencies with information to support their decision-making processes. The table also lists the types of activities that would be subject to these requirements.

TABLE 2.3
Discretionary Permits Potentially Required

Agency	Permits and Authorizations Required	Activities Subject to Regulations
Regional Water Quality Control Board (San Francisco Bay)	Storm Water Pollution Prevention Permit	Required for construction on sites of one acre or more.
California Air Resources Board	Registration of portable engines not used for motor vehicles.	Portable engines above 50 HP (e.g., air compressors and generators) are required to have a current registration with CARB.
Division of Safety of Dams	Review and approval of plans for modifying the dam embankment, lowering the embankment height, and draining the existing reservoir.	The Estates Reservoir and Embankment is currently under DSOD jurisdiction.
California Department of Fish and Game and U.S. Fish and Wildlife Service	Determine size of buffer zones for nesting raptors or special species birds, if construction occurs during the February 1-August 31 breeding season.	Coordinate preconstruction surveys for nesting raptors or special species birds, in conjunction with qualified wildlife biologist.

Source: EBMUD 2009

No encroachment permits are required for the Project since all construction will occur on EBMUD owned property. Furthermore, pursuant to Section 53091 of the California Government Planning Code, EBMUD is also exempt from zoning and building ordinances of a city or county, for the location or construction of facilities for the production, generation, storage or transmission of water. The Estates Reservoir Replacement Project meets the criteria for this exemption.

References

Department of Toxic Substances Control, CAL-EPA, January 2008 Fact Sheet, Requirements for Generators of Treated Wood Waste. California Government Code, 53091

Chapter 3
Environmental Setting, Impacts and Mitigation Measures

3.1 Introduction

3.1.1. Organization of Chapter 3

Chapter 3 is organized by environmental discipline, as follows:

- 3.2 Visual Quality
- 3.3 Geology, Soils, and Seismicity
- 3.4 Biological Resources
- 3.5 Cultural Resources
- 3.6 Traffic and Circulation
- 3.7 Air Quality
- 3.8 Greenhouse Gas
- 3.9 Noise and Vibration

Each section of Chapter 3 provides the following, based on requirements of the California Environmental Quality Act (CEQA).

Approach to Analysis

This subsection describes the general approach to analyzing a given environmental topic and cross-references related issues addressed elsewhere in this Environmental Impact Report (EIR).

Setting/Regulatory Framework

This subsection presents a description of the existing physical environmental conditions in the vicinity of the Project and pertinent regulations including local and regional plans.

Significance Criteria

Refer to the discussion presented in Section 3.1.3.

Impacts and Mitigation Measures

Refer to the discussions presented in Sections 3.1.3 and 3.1.4.

3.1.2. Resources Not Evaluated Further in The EIR

Section 15128 of the CEQA Guidelines addresses Effects Not Found To Be Significant.

"An EIR shall contain a statement indicating the reasons that various possible significant effects were found not to be significant and were therefore not discussed in detail in the EIR. Such statement may be contained in an attached copy of an Initial Study",

Section 15083 Early Public Consultation

"(a) Scoping has been helpful to agencies in identifying the range of actions, alternatives, mitigation measures, and significant effects to be analyzed in depth in an EIR and in eliminating from detailed study issues found not to be important."

Pursuant to Section 15128 and 15083 (a) of the CEQA Guidelines, this EIR shall analyze only those effects identified as potentially significant in the Initial Study prepared for this Project. These effects include: Aesthetics; Biological Resources; Cultural Resources; Noise; Air Quality; Geology/Soils; and Transportation/Traffic. In addition, to meet state requirements to consider greenhouse gas contributions to potential climate change, an analysis of the Project's greenhouses gas emissions and potential to contribute to global warming is also included in this EIR.

Effects found not to be significant and excluded from this EIR include: Hazard/ Hazardous Materials; Public Services; Utilities/Service Systems; Agricultural Resources; Recreation; Population/Housing; and Land Use/Planning.

The Initial Study prepared for the Project is attached as Appendix B.

3.1.3 Impact Significance

In Chapter 3, the environmental impacts of the proposed Project are identified and classified as either significant or less than significant. Section 15382 of the CEQA Guidelines defines a significant impact as "a substantial, or potentially substantial, adverse change in any of the physical conditions within the area affected by the project." For each category of physical conditions evaluated in this EIR, criteria for significance have been developed, using the CEQA Guidelines, city and county standards and policies, or the "significance thresholds" of federal, state, regional, or local agencies. Impacts classified as significant meet the criteria for significance developed for each category of physical conditions. Impacts that are not significant (because they do not meet the significance criteria) are identified as less than significant (and/or beneficial). These less than significant impacts include conditions where there is no measurable physical change in the environment, i.e., no impact. Impacts were determined by comparing the environmental effects of constructing and operating the Estates Reservoir Replacement Project with existing environmental conditions. Each impact is numbered,

and mitigation measures identified for that impact are assigned the same number. Chapter 5 addresses cumulative impacts associated with the proposed Project.

3.1.4 Mitigation Measures

CEQA Guidelines Section 15126.4(a) (1) states that an EIR "shall describe feasible measures, which could minimize significant adverse impacts..." Section 15126.4(a) (3) also states that "mitigation measures are not required for effects, which are not found to be significant." In this EIR, mitigation measures are identified (where feasible) for all of the significant impacts and for some of the impacts labeled as less than significant, and the residual effect after mitigation is noted. In general, mitigation measures proposed reduce potential impacts to a less than significant Level After Mitigation, but for three resource issues, impacts remain Significant and Unavoidable, Even With Mitigation. All mitigation measures noted are proposed as part of the Project, including the optional measures proposed for impacts considered to be less than significant or beneficial.

Mitigation measures will be incorporated into contract specifications to be implemented by contractors (or East Bay Municipal Utility District (EBMUD) employees), and monitored by EBMUD construction inspectors and EBMUD staff. The Mitigation Monitoring and Reporting Program prepared for the Project identifies the responsible parties through each project phase, from Design and Construction to Operations and Maintenance.

3.2 Visual Quality

3.2.1 Approach to Analysis

This section addresses the aesthetic and visual quality impacts associated with construction and operation of the proposed Estates Reservoir Replacement Project. It includes a description of visual conditions in the Project area and an evaluation of potential effects on visual resources and public view corridors. Presumed views from private viewpoints are also discussed, based on existing visual conditions at the Project site and surroundings. This visual assessment focuses on the Estates Reservoir replacement which entails major site disturbance and structural change, since no structural change is proposed for the Montclair Pumping Plant or site.

For purposes of this analysis, visual or aesthetic resources are generally defined as the natural and built landscape features that can be seen. The overall visual character of a given area results from the combination of natural landscape features, including landform, water, and vegetation patterns, as well as the presence of built features such as buildings, roads, and other structures.

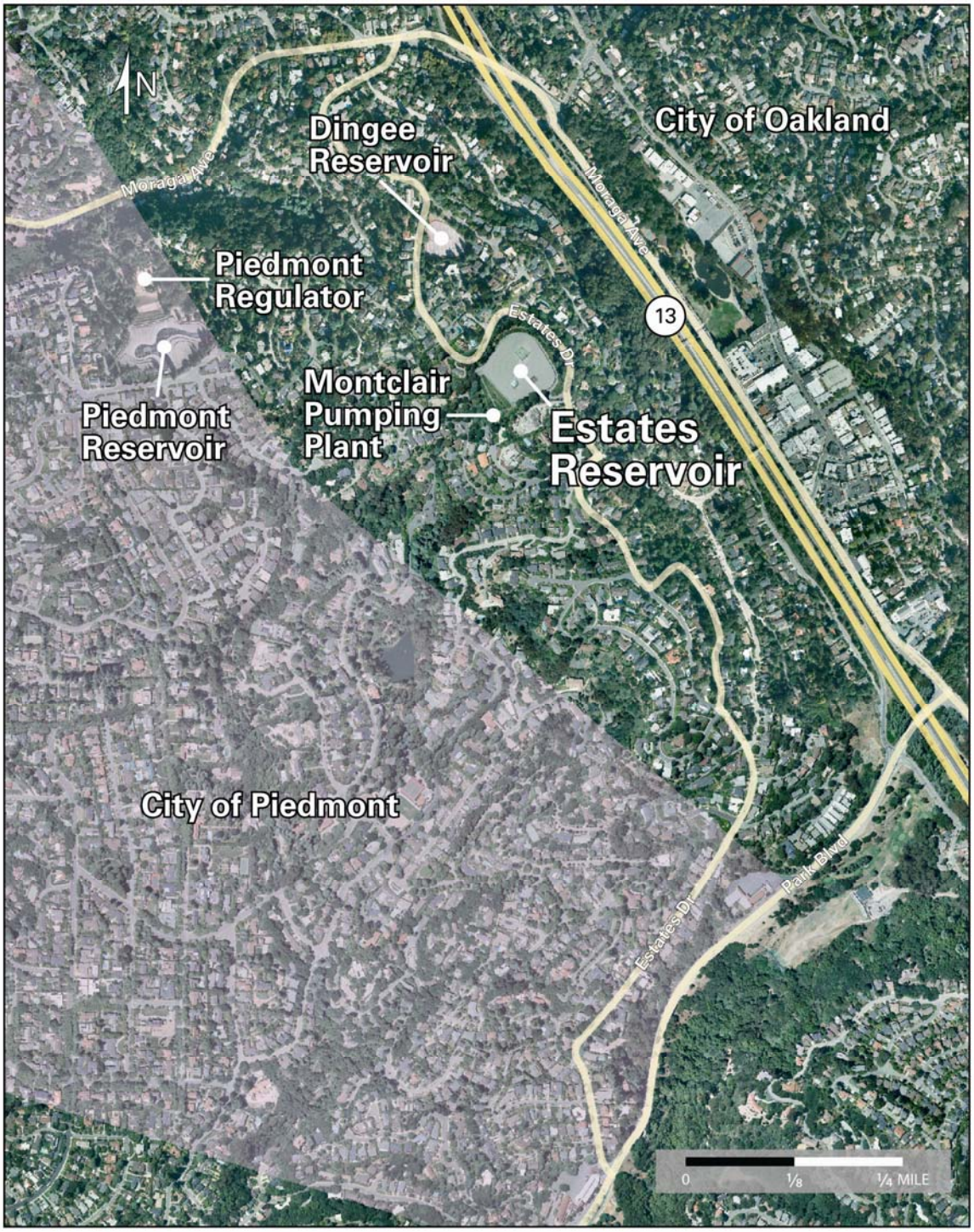
The EIR impact analysis considers view obstruction, negative aesthetic effects, and light and glare effects. As part of the analysis, a set of computer-generated visual simulations have been produced to illustrate conceptual "before" and "after" visual conditions as seen from key public vantage points. The visual simulations provide a clear depiction of the location, scale, and general appearance of proposed Project changes. Digitized photographs and computer modeling and rendering techniques were used to prepare the simulation images. The simulations are based on conceptual project drawings and technical data developed by EBMUD and its architectural consultant Royston Hanamoto, Alley and Abey (RHAA), in 2008 (updated 2009).

The visual assessment is based on field observations of the Project site and surroundings in addition to a review of topographic maps, project drawings, and technical data, aerial and ground-level photographs of the Project area, and computer-generated visual simulations from representative viewing locations.

3.2.2 Setting

Regional Setting

The Estates and Dingee Reservoir sites are located in the Oakland Hills. **Figure 3.2-1** shows the regional landscape context for the Estates Reservoir Replacement Project.



Source: EBMUD 2008

Estates Reservoir Replacement Project Regional Landscape Context
Figure 3.2-1

The area's visual setting contains visual resources representative of California's northern Coast Range mountains and inland valley landscapes. Natural features include rolling grass covered hillsides, steep rugged hills and narrow ravines; broad valleys and prominent ridges, meandering tree lined creeks and drainages, and oak woodlands.

Within this setting, peaks, open ridgelines and wooded hillsides are prominent landscape features that provide a visual backdrop for the region's urban and suburban development pattern.

The primary topographic feature is the Berkeley-Oakland Hills, which roughly parallel the San Francisco shoreline, rising to elevations of over 1,500 feet.

Several major roadway corridors traverse the Project area. Interstate I-580 parallels the Oakland Hills. Highway 24, a scenic corridor, passes from Oakland through a tunnel in the Berkeley Hills and connects with I-680 in the urbanized valley. Highway 13 (Warren Freeway segment) runs in a north to south direction from Highway 24 along the sparsely developed lower Oakland foothills to the densely developed "flatlands", and connects with I-580.

Project Area Setting

Visual Character and Quality - Estates Reservoir occupies a partially wooded 6.7 acre site, off Estates Drive with access off Highway 13 via the Moraga Road freeway exit. **Figure 3.2-2** shows the existing site characteristics and features for the Estates Reservoir site.

Originally constructed in 1903 and enlarged in 1934 and 1938-39, the Estates Reservoir site includes a 2.5-acre terraced roof of built-up tar and gravel including two fountains and a planter. Vehicle access to the site is from Estates Drive. As of June 2008, both fountains were permanently removed from service and the planter cleared of vegetation because of the drought and to increase EBMUD's water conservation efforts. Eliminating water supply to the fountains is consistent with the May 2008 Board Resolution declaring a water shortage emergency and adopting the 2008-2009 Drought Management Program. In addition the EBMUD's 2020 and proposed 2040 Water Supply Management Programs, also identify the need for aggressive water conservation polices, goals, and objectives to achieve the water supply necessary to meet forecast demands.

The perimeter of the reservoir is bordered by a 12-15-foot wide interior access road. A landscaped strip of approximately 50 feet exists between the interior access road and Estates Drive for more than half of the facility perimeter. The landscaped strip consists mostly of ornamental shrubs and planted trees with a few native trees mixed in. The downstream face of the existing reservoir embankment slopes towards Wood Drive.

The site is set within a residentially developed community and is surrounded by residences including some at higher elevations, providing views into the site.

Figure 3.2-3 depicts a plan and profile view of the existing site facilities, conditions and features, and identifies residences adjacent to the site.

Source; EBMUD 2008

Estates Reservoir Site - Existing Site Characteristics and Features
Figure 3.2-2

Project Viewshed and Public View Corridors

Existing - Due to the presence of mature tree cover along the site perimeter and embankment downslope of the reservoir, views of the Estates Reservoir site from Estates Drive and residents' homes are partial and filtered. Pedestrians utilizing the informal footpath along the Project fence line have more direct, eye-level views into the site. **Figure 3.2-3** also presents photographic views of the site as seen from adjacent residences and depicts the viewpoint locations. Existing views of the site from residences surrounding and overlooking the site are filtered and partial; the visual focus is the tar and gravel reservoir roof with two large (now dry) fountains and empty planter, which is essentially a "hardscape" view, surrounded by mature trees and shrubs.

Proposed - Based on a design assessment conducted by RHAA in 2008 (updated 2009), eight primary views were identified and analyzed to determine which design concepts would best address Project impacts on site aesthetics and the community's

concerns. Primary concerns are graphically represented in **Figure 3.2-4**. Through analysis of the Project site, goals and objectives, and with community input from a series of public meetings (detailed in the RHAA Estates Concept Design Process Recommendations Report, 2008 [updated 2009], and in **Appendix A**, Public Outreach), five design alternatives were developed.

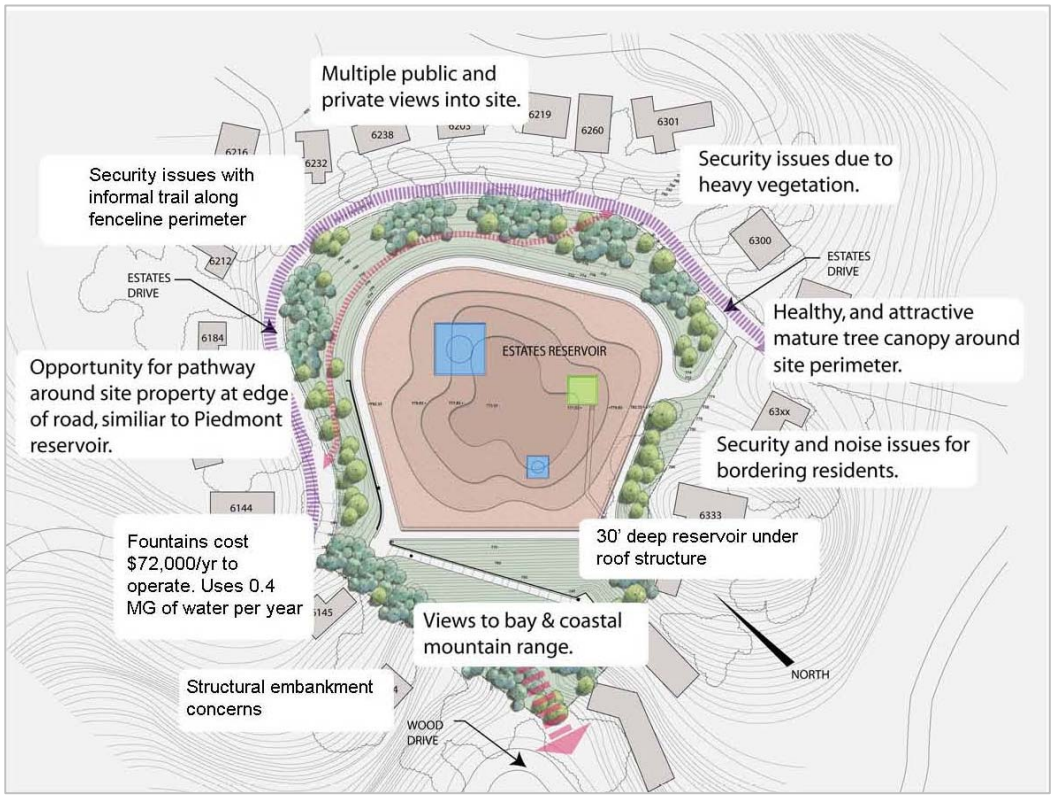
The preferred design selected for the Project (Figure 2-3) includes:

- Demolition of the existing open cut reservoir, roof and structures.
- Construction of two smaller buried tanks in the existing basin, with backfill from the concrete reservoir lining debris and the earthen embankment.
- Construction of a textured retaining wall to provide a visually interesting transition from the grass planted reservoir roof tops to the floor of the excavated bowl. This wall will provide a distinctive, new architectural element to the site.
- Construction of a new valve pit at the base of the existing basin.
- A comprehensive landscape plan for all areas disturbed by construction (the excavated bowl and cut area around the new road to the Montclair Pumping Plant below the reservoir), consisting primarily of native grasses and shrubs, and a few trees.
- Construction of a low wooden fence along the Estates Drive site perimeter.

The proposed design will integrate the new construction within the existing site, to create a visually continuous and harmonious landscape, in a park-like setting. Proposed views of the site will be a visual improvement, and the overall aesthetic impact is considered beneficial and therefore a less than significant impact. However, because of the community concerns expressed about this Project, more detailed discussions and analysis according to defined CEQA significance criteria are presented in Section 3.2.3, Impacts and Mitigation Measures.

Source RHAA 2009

Plan and Profile View of the Existing Site Facilities, Conditions and Features, Residences Adjacent to the Site
Figure 3.2-3



Source: EBMUD 2008

Estates Reservoir - Primary Concerns
Figure 3.2-4

3.2.3 Impacts and Mitigation Measures

Significance Criteria

For the purposes of this EIR and consistent with Appendix G of the CEQA Guidelines, the Project would have a significant impact if it would:

- Have a substantial, adverse effect on a scenic vista;
- Substantially damage scenic resources, including but not limited to trees, rock outcroppings, and historic buildings within a state scenic highway;
- Substantially degrade the existing visual character or quality of the site and its surroundings; or
- Create a new source of substantial light or glare that would adversely affect day or nighttime views in the area.

The significance determination is based on several evaluation criteria, including the extent of Project visibility from sensitive viewing areas such as designated scenic routes,

public open space, or residential areas; the degree to which the various Project elements would contrast with or be integrated into the existing landscape; the extent of change in the landscape's composition and character; and the number and sensitivity of viewers.

Impacts and Mitigation Measures

Impact 3.2-1: Short-term visual effects experienced from nearby areas during Project construction.

Construction activities associated with the reservoir replacement would require earthwork, stockpiling of material, and the use of heavy equipment. Earthwork could periodically create dust. The construction period is projected to last a maximum of two years. Construction would be limited to the general area of the existing basin and access roadways within the Project site. The degree to which construction activities within the excavated reservoir bowl would be noticeable would vary, depending on the view currently experienced by residents, pedestrians and drivers along Estates Drive. Downward views into the site (from adjacent residences) would be filtered by existing vegetation, drivers along Estates Drive would have fleeting images, and pedestrians would have limited, eye-level views across and into the bowl. Most views would be partial and obstructed. Because the Montclair Pumping Plant is located to the rear of the reservoir, and on a downslope screened from Estates Drive, views of equipment and vehicles during installation of replacement facilities over a maximum four month period would be even less discernable. Although Impact 3.2-1 is considered less than significant, EBMUD proposes to implement Measure 3.2 -1 to further screen construction activities from off-site views and ensure that the construction site is maintained in an orderly manner, and to communicate the project need to area residents.

> **Measure 3.2-1:** EBMUD will require the contractor to ensure that the construction site is clean by storing building materials and equipment within the proposed staging areas in the reservoir bowl, or in areas removed from public view, and by promptly removing construction debris that is not to be reused on-site. Construction phasing shall be organized to minimize equipment storage on-site.
>
> EBMUD will also use interpretive materials to explain the need for the Project, in attractive and simple graphic displays. Signage locations could include, but would not be limited to, areas near the Estates Reservoir entry, along Estates Drive and the residentially developed segments of the truck route.

Significance after Mitigation: Less than Significant.

Impact 3.2-2: Alteration of the site's appearance and long-term visual effects.

The changes proposed as part of the reservoir replacement would constitute a major alteration in the appearance of the Project site at project completion, a significant impact. The specific modifications proposed and the resulting changes in site appearance are described below, with references to proposed site layout drawings.

Removal of the tar and gravel reservoir roof, fountains and concrete planter and replacement of the existing open cut reservoir with two smaller buried tanks within the landscaped bowl would noticeably alter existing visual conditions, by changing a "hardscape" view of the tar and gravel roof for a comprehensively planted landscape area that is integrated with existing mature vegetation on the site (a "softscape" view).

Proposed landscaping of the entire bowl and new tank roofs with grasses and native shrubs would create visual continuity within the new reservoir site and the existing landscaped setting. The textured, curved retaining wall alongside the tank walls will create a striking new architectural feature that will establish new site aesthetics while echoing the curved design elements of the demolished (Royston designed) roof. Overall, the change from the existing "hard" surface to the completely landscaped bowl will create a more harmonious, natural setting that significantly improves site aesthetics and visual quality.

The new design also returns the site to its original open-space landscape character which existed before the site was dammed as an open reservoir and then roofed. Ultimately, the new Project and landscape plan will provide an improved view for the majority of people that drive or walk around the site perimeter, whereas the existing fountain/planter structure is viewed primarily by a limited number of people looking down into the site.

Reducing the dam embankment by 25 feet and reconstructing the road from the reservoir site to the Montclair Pumping Plant will entail removal of shrubs and groundcover, but no mature trees will be removed. Areas disturbed by construction of the new access road will be replanted with native shrubs and grasses, similar to the treatment proposed for the reservoir site. Existing perimeter landscaping along Estates Drive and downslope of the dam embankment between the Montclair Pumping Plant and Woods Drive would be preserved.

Regarding the existing perimeter chain-link fence, the six foot high fence with two inch black webbing will be replaced with an eight foot high fence with one inch webbing. The replacement fence alters but does not significantly reduce visibility into the site or compromise site aesthetics. However, it will improve site security consistent with EBMUD's Vulnerability Assessment Program and stated community concerns.

The conceptual landscape plan proposed as part of the Project includes a recommended palette of drought tolerant grasses, shrubs and trees. The landscape design scheme will be refined during the final design phase, but will remain generally consistent with the landscape plan presented in this EIR and in the 2008 RHAA report (updated 2009). Overall, the landscape plan will improve site aesthetics, provide screening of the replacement reservoirs, and integrate the new facilities with existing landscaping, as well as provide a measure of erosion control for the significantly re-graded bowl. To ensure

that the Project is implemented and maintained as proposed, and that public input is incorporated into the landscape plan, the following measures are listed.

Measure 3.2-2:

- A Landscape Plan for the Estates Reservoir Replacement Project will be prepared during the Design Phase that will be consistent with the RHAA Concept Design Process and Recommendations Report 2008 (updated 2009), and ensure that areas disturbed by construction are re-graded and planted to result in landforms that are compatible with existing site topography and landscaping, as well as the neighborhood setting.
- EBMUD will coordinate with neighborhood representatives regarding the placement of new plantings to effect screening, and this input will be incorporated into the Final Landscape Plan.
- The contractor shall be required to warrant landscape plantings for one year after project completion.
- Annual vegetation/tree pruning, consistent with City of Oakland Fire Department Fire Abatement Regulations, will continue to be implemented.
- EBMUD will ensure that the contractor restores graded, disturbed areas to a natural-appearing landform.
- Site improvements will include aesthetic/architectural treatment where facilities are located near to, or are visible from, public trails and residences, namely:
  - Creating a new drainage feature with rocks and stones, around the reservoir valve pit at the base of the excavated basin.
  - Improving the existing trail on EBMUD property, along Estates Drive.
  - Constructing a low, rustic, wooden fence along Estates Drive.
  - Constructing a parking area for EBMUD equipment and staff vehicles in the valve pit.
  - Replacing the existing six foot high perimeter chain link fence with two inch black webbing with an eight-foot high fence with one-inch webbing, in the same color (black) and at the same location.

Significance after Mitigation: Less than Significant.

Impact 3.2-3: Effects on a scenic vista.

The Project site is not within a defined scenic vista. Existing perimeter vegetation along Estates Drive allows only filtered views into the site from adjacent residences. Mature trees on the dam downslope block distant views of the Bay. Project demolition and construction will occur within the bowl of the existing reservoir and will not create or open scenic vistas. Reduction of the dam embankment by 25 feet will open views to the lower site but mature trees along the embankment slope (towards Woods Drive) will continue to block/filter distant views of the Bay. The overall impact to scenic vistas is not considered significant.

Mitigation Measure: None Required.

Impact 3.2-4: Effects on views from the surrounding area, including public roadways, public trails, and open space and residential areas.

As previously described, construction of the replacement tanks at Estates Reservoir site would result in a significant transformation of the visual character and site aesthetics, for pedestrians, adjacent residents, and drivers along Estates Drive. No such changes are associated with the pumping plant improvements because no structural changes are proposed to the plant.

As part of the aesthetic impact evaluation for the proposed Project, visual simulations were produced using computer modeling and rendering techniques. As presented in **Figure 2-3** the simulations illustrate the appearance of the proposed Project changes as seen from representative public viewing locations along Estates Drive. The top and side images are visual simulations depicting the proposed Project and the bottom images (Views 1-3) are photographic views showing the existing visual condition. Four basin views (into the excavated bowl) are also depicted. The evaluation of potential visual impacts associated with the proposed Project is based, in part, on a comparison of images portrayed in the simulations, on the proposed design and landscaping, and on an assessment of the degree of visual change that the Project would establish.

All simulations of the site show views of an expansive park-like setting, with ground surfaces planted with grasses and framed by existing trees. Views into the basin show a new drainage feature with rocks and a paved surface that contains the reservoir valve pit, and the curved retaining wall is clearly defined. The replacement eight foot high black chain link fence is also represented. Native trees will be planted in the bowl, at random, to avoid a formal, linear pattern that does not reflect a natural landscape.

As illustrated in the simulations, Project related visual changes would not substantially affect existing views from the surrounding residential area because existing perimeter vegetation along Estates Drive, which provides site screening will remain unchanged. Views into the site would continue to be partial/filtered and as landscaping within the bowl becomes established and matures, new plant material would create visual interest and also provide screening. Over time, the proposed landscaping would integrate the new tanks, valve pit and re-contoured embankment slope within the overall site landscape. Therefore the visual impact is considered less than significant.

Measure 3.2-4: Implement Measure 3.2-2, as detailed above.

Significance after Mitigation: Less than Significant.

Impact 3.2-5: New sources of light and glare associated with the reservoir construction.

Project Construction - Nighttime construction beyond the normal construction work hours is not proposed but under unspecified or yet unknown conditions (emergencies)

nighttime construction may be warranted. If warranted, the purpose and hours of nighttime construction would be defined and adjacent residents notified in advance, if feasible or if nighttime construction is of more than 24 hours duration. Night lighting, including the installation of temporary light poles, would need to be installed but would be removed when project construction is complete. Nighttime construction would affect views from adjacent residences and could be visible from residences along Estates Drive. However, given the level of existing screening provided by perimeter and intervening vegetation bordering and within the Project site, and the fact that any such construction would occur within the reservoir area, it is expected that nighttime lighting effects on roadway and residents' views would be partial, intermittent and brief in duration. With implementation of Measure 3.2-5, these short-term visual effects would be less than significant.

Project Operations - The proposed Project does not include installation of permanent new exterior lighting and therefore would not result in nighttime lighting effects. The Project would not introduce reflective surfaces, such as glass or metal, that have the potential to reflect light. Therefore, the proposed Project would not result in permanent new sources of potential light and glare, and there is no significant impact.

> **Measure 3.2-5:** To the extent possible**,** EBMUD will ensure that stationary lighting used during nighttime construction (if required) is of limited duration and shielded and directed downward or oriented such that little or no light is directly visible from Estates Drive. No permanent nighttime lights will be constructed on the site.

Significance after Mitigation: Less than Significant.

References

Royston Hanamoto Alley and Abey, Landscape Architects and Planners. *Estates Reservoir Concept Design Process and Recommendations*, prepared for East Bay Municipal Utility District. 2008, (updated 2009).

3.3 Geology, Soils and Seismicity

3.3.1 Approach to Analysis

This section evaluates whether construction and operation of the proposed Estates Reservoir Replacement Project would result in potential adverse impacts related to local geology, existing soil conditions, or seismicity. The analysis is based, in part, on review of various geologic maps and reports (note references at end of section) and other literature.

3.3.2 Setting/Regulatory Framework

Regulatory Jurisdiction

Since 1929, the State of California has supervised the construction and operation of dams to prevent failure and to safeguard life and property. The California Division of Safety of Dam (DSOD) supervises the construction, enlargement, alteration, repair, maintenance, operation, and removal of dams and reservoirs. DSOD has jurisdiction over all dams in the state that are not federally owned, that are 25 feet or higher, and that have a storage capacity of 50 acre-feet of water or greater, with the exclusion of the dams that are 6 feet or less in height (regardless of storage) and the dams with a storage capacity of 15 acre-feet or less (regardless of height). DSOD conducts annual inspections of dams under its jurisdiction and periodically requires that they are evaluated with respect to safety and seismic stability (Wahler Associates 1980; Fraser and Howard, 2002; URS, 2006). DSOD also mandates corrective measures, if required, to ensure the safe operation of the facility. Based on the URS 2006 report, the estimated crest vertical settlement for the Hayward Fault maximum credible earthquake is between 3-4 feet. This crest settlement is not judged to provide an adequate margin against potential overtopping of the embankment if the reservoir was full during the earthquake.

DSOD has regulatory jurisdiction over the existing Estates Dam. As a requirement for the continued operation of the Estates Dam, EBMUD submits an annual instrumentation performance report to DSOD for review and approval. In 2006, EBMUD proposed to DSOD that the elevation of the Estates Reservoir would be lowered seven feet below the Estates Dam crest, to increase safety from excessive settlement of the crest. In early 2007, DSOD accepted EBMUD's proposal as an interim measure, with the understanding that EBMUD would continue to aggressively pursue a schedule for permanent remediation. EBMUD subsequently notified DSOD that the Estates Dam would be removed from service by 2013, and would continue to operate seven feet below the dam crest in the interim. DSOD accepted this proposal. The Estates Dam will be removed from the regulatory oversight and jurisdiction of DSOD, once the existing Estates Reservoir is demolished and storage is converted to two smaller replacement tanks.

Regional Geology

Estates Reservoir and Dam are located within the seismically active San Francisco Bay region between the Pacific plate on the west and the Sierra Nevada-Central Valley ("Sierran") microplate on the east. Geodetic data demonstrate that net motion between the two plates is obliquely convergent. The oblique motion of the Sierran microplate relative to the strike of the San Andreas and Hayward faults results in a small component of net convergence normal to these structures, which is accommodated by both strike-slip and thrust faulting in the eastern San Francisco Bay area.

The Estates Reservoir site is situated in a narrow ravine near the western edge of the East Bay Hills. The East Bay Hills region is within the central Coast Range geomorphic province of California and is bounded by the Hayward fault on the west and the Northern Calaveras fault on the east.

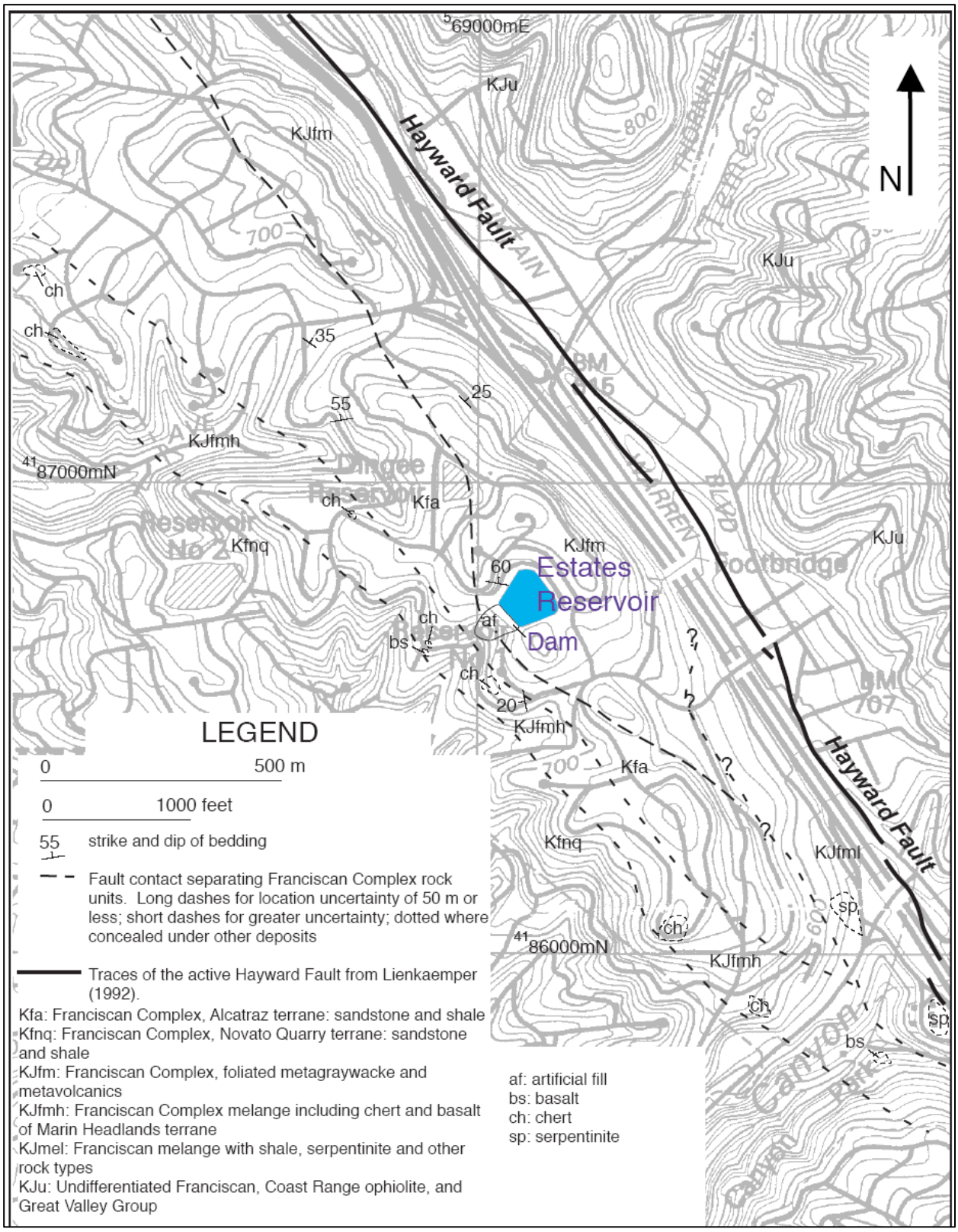
Site Geology

The site geology in the vicinity of the Project site and dam is illustrated in **Figure 3.3-1**. The rock at the dam site and surrounding the reservoir appears to be blueschist-facies metagraywacke of the Franciscan Complex. The Franciscan bedrock units in the vicinity of the dam site include a blueschist-facies metamorphic unit, Alcatraz Terrane, Mélange including Marin Headlands Terrane rocks, Novato Quarry Terrane, and undifferentiated mélange.

The Hayward Fault is located about 1,400 feet northeast of Estates Dam and is the only fault with demonstrated Holocene activity that has been mapped near the reservoir or dam (Lienkaemper, 1992). The Hayward Fault in this area strikes subparallel to the Warren Freeway (State Highway 13) and is located slightly east of the freeway. This fault marks the contact between Franciscan Complex bedrock units to the west and Coast Range ophiolite, Great Valley Group with minor Franciscan Complex rocks to the east. Several different Franciscan Complex rock units crop out west of the Hayward fault and the strikes of their bedding, as well as the strikes of the bounding contacts, are slightly more westerly (by about 15 to 20 degrees) than that of the Hayward fault. This bedrock structural grain and resultant erosional contrasts may have influenced the general shape of the hills in this area because the ridge crests trends have a similar orientation. The Franciscan rock units west of the Hayward fault, including those in the vicinity of the Estates Dam and Reservoir, have a northeasterly dip.

Fault Rupture

There is no evidence of Holocene activity in possible minor faults or shears in the Franciscan rock units at the Estates Reservoir site, either as independent faults or as structures that exhibit co-seismic movement with earthquakes on the Hayward Fault (Lienkaemper, 1992). Therefore, no fault study trenching has been performed at the site. Accordingly, the potential for fault rupture at the dam site is judged to be very small.



Source: EBMUD 2008

Geologic Map of the Estates Reservoir Area
Figure 3.3-1

Geologic Hazards

Landslides and Slope Failure - Slope failures, commonly referred to as landslides, include many phenomena that involve the downslope displacement and movement of material, either triggered by static (i.e., gravity) or dynamic (i.e., earthquake) forces. A slope failure is a mass of rock, soil, and debris displaced downslope by sliding, flowing, or falling. Exposed rock slopes undergo rockfalls, rockslides, or rock avalanches, while soil slopes experience shallow soil slides, rapid debris flows, and deepseated, rotational slides. Landslides may occur on slopes of 15 percent or less; however, the probability is greater on steeper slopes that exhibit old landslide features such as scarps, slanted vegetation, and transverse ridges. Landslide-susceptible areas are characterized by steep slopes and downslope creep of surface materials. Debris flows consist of a loose mass of rocks and other granular material that, if saturated and present on a steep slope, can move downslope. The rate of rock and soil movement can vary from a slow creep over many years to a sudden mass movement. Landslides occur throughout the State of California, but the density of incidents increases in zones of active faulting. There is no mapped landslide at the Estates Reservoir site.

Mineral Resources

The California Geological Survey (CGS) has classified lands within the San Francisco Bay region into four Mineral Resource Zones (MRZs). The classification of MRZs is based on guidelines adopted by the California State Mining and Geology Board, as mandated by the Surface Mining and Reclamation Act of 1975. MRZ-1 zones are areas where adequate information indicates that no significant mineral deposits are present, or where it is judged that little likelihood for their presence exists. MRZ-2 zones, are areas where adequate information indicates significant mineral resources are present, or where it is judged that a high likelihood for their presence exists. MRZ-3 zones are considered to have potential mineral deposits, but their significance cannot be evaluated from available data. MRZ-4 zones are areas where available information is inadequate for assignment to any other MRZs category. No MRZs were identified on the Project site.

According to the City of Oakland General Plan, Open Space and Recreation Element Technical Appendices, 1993, although quarrying for volcanic rocks was once commonplace throughout the Oakland Hills, and has historically been used for construction and development, today there are no remaining quarries in the City and current City policy prohibits quarrying unless compelling evidence can be presented indicating that the benefits will outweigh the environmental costs.

Soils

Dam Embankment - Foundation Soils

The depth of foundation excavation and level of preparation prior to placement of the embankment is unknown but thought to be limited. The foundation soils generally

consisted of stiff to very stiff sandy clay, silty clay and clay with sand. Medium to stiff dark-colored sandy and silty clay with organics was encountered in a few borings, possibly indicative of an original surface layer that was incompletely removed during original construction. Overall, the data do not indicate the presence of a continuous layer of organic-rich, dark-colored, potentially weak native foundation soil beneath the dam. The shear strength properties of the foundation soils are similar to those of the overlying 1903 fill material. The foundation soil is also judged to be not susceptible to liquefaction.

Dam Embankment - Material/Soils

The main body of the embankment was placed in 1903 with material excavated from the upstream basin and compacted by horse-drawn equipment. Additional embankment fill was placed along the downstream slope between 1938 and 1939 to raise the dam. This fill was placed with a bulldozer and compacted with a sheepsfoot roller. Thus, the embankment consists of two main zones: fill of 1903 and fill of 1938-39. The foundation consists of colluvium and residual soils underlain by bedrock.

Embankment Conditions

1903 and 1938-39 Fill - The 1903 fill consists primarily of clayey sands and sandy clays, with gravel. The color of the material varies from yellowish brown and gray to bluish gray and dark gray. With sufficiently high fines contents, the 1903 fill is judged not susceptible to liquefaction.

During the 1938-1939 construction, a wet "boggy" area near the downstream toe, which was caused by spring(s), was excavated and drained, and backfilled with new fill material. Tile drains were placed in the trenches to reach the seepage sources.

The 1903 and 1938-39 fill materials are similar in appearance, and were described as "basically indistinguishable" in early investigations. However, a recent investigation (URS, 2006) shows that the 1938-39 fill is significantly stronger than the 1903 fill. The stronger fill was likely due to the use of modern soil compaction equipment for the fill construction.

Because the 1938-39 fill has similar index properties to those of the 1903 fill, the 1938-39 fill is also judged to be not susceptible to liquefaction.

Proposed Tank Foundation Conditions

The bedrock at the proposed tank foundation and in the surrounding area appears to be primarily metagraywacke of the Franciscan Complex. The bedrock at the proposed tank foundation is overlain by up to nine feet of residuals, colluvium, fill, and existing reservoir concrete lining (EBMUD Drawings 4394-G-2.2, -2.3, and -2.4). Downhole

seismic surveys in the dam area indicate that the shear wave velocity of the materials near the bedrock surface is about 1,500 feet per second. The shear wave velocity of the materials increases rapidly with depth such that a representative average of the velocities beneath the dam is at least 2,000 feet per second.

Groundwater Conditions

The groundwater level in the dam used for stability analysis was estimated based on the piezometric data corresponding to a reservoir filled to the spillway elevation of 770 feet. The groundwater level is at approximately Elevation 746 beneath the dam crest. From the dam crest, the groundwater level follows a gentle downward gradient to about Elevation 675 feet at the downstream toe of the dam. The presence of groundwater at a hillside like the Estates Reservoir site is common and the groundwater level may be subject to large seasonal fluctuations. There are natural springs in the area that contribute to the groundwater regime at the site.

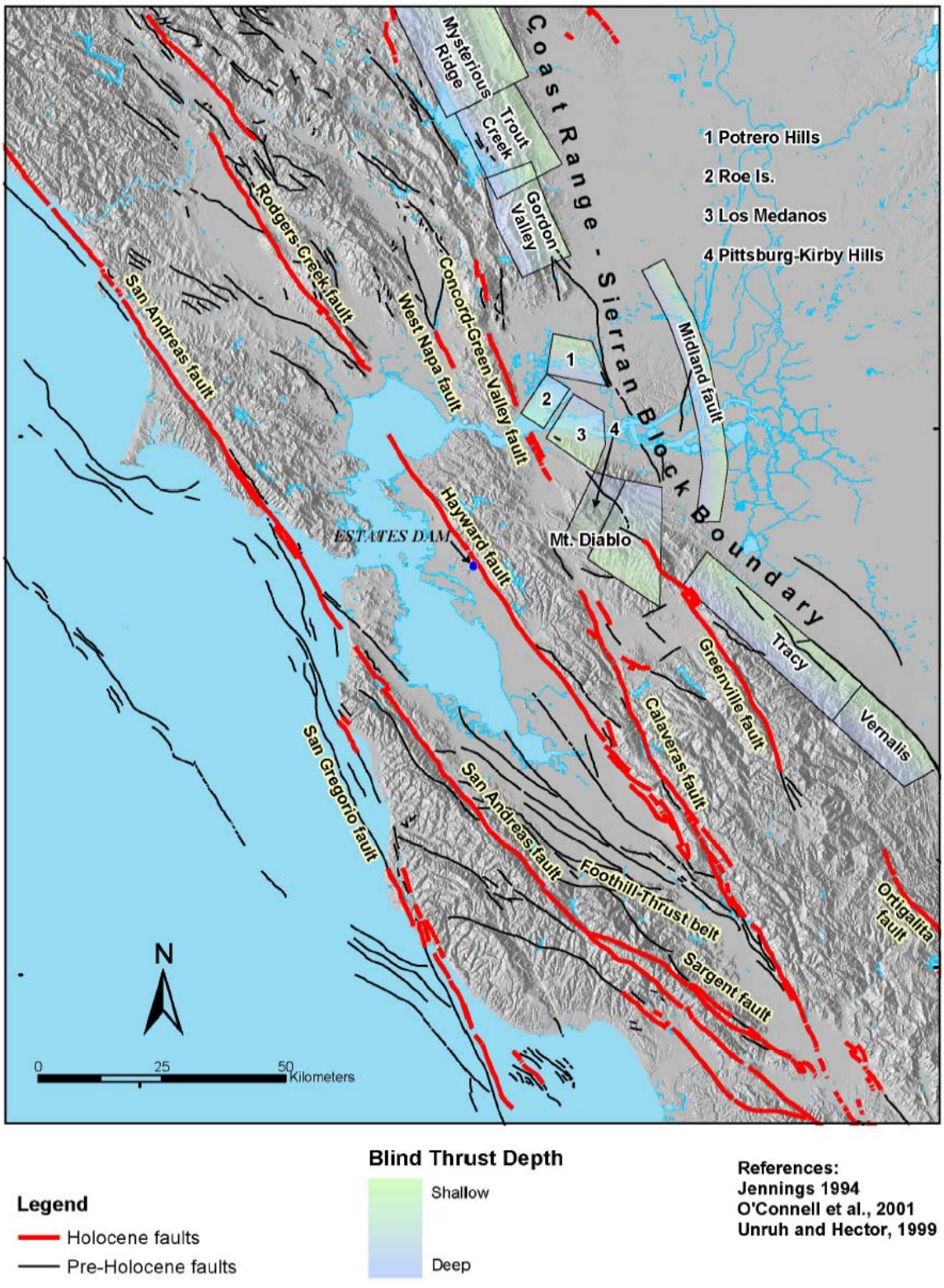
Seismicity

Seismic Sources

The Hayward-Rodgers Creek fault is located about 0.3 kilometers northeast of the Estates Reservoir site. This fault was the source of an estimated magnitude (M) 6.8 earthquake on October 21, 1868. The San Andreas fault, located about 29 kilometers west of the dam, was the source of the 1906 Great San Francisco earthquake. Other active faults within 50 kilometers of the dam that are considered as potential sources of future large earthquakes include the Mount Diablo Thrust, Concord-Green Valley, North Calaveras, San Gregorio-Seal Cove, and Greenville faults. The locations of the main potential seismic sources in the region are shown in **Figure 3.3-2.**

The maximum magnitudes for each identified seismic source were estimated based on the potential rupture length and seismogenic depth, using an empirical relationship that relates earthquake magnitude and rupture area as proposed by Wells and Coppersmith (1994). Site-to-source distances were measured from the dam site to the main trace of each fault. The estimated maximum earthquake magnitudes and site-to-source distances for each of the main faults in the region are listed in **Table 3.3-1.**

Because of its magnitude and site-to-source distance, the Hayward-Rodgers Creek fault is likely to generate the strongest ground motions at the dam site. The estimated maximum magnitude for this fault is moment magnitude (M_w) 7¼. The San Andreas fault, located about 29 kilometers west of dam, is capable of generating long duration shaking due to its large maximum magnitude (M_w 8.0). All other intermediate faults have estimated maximum magnitudes lower than the Hayward-Rodgers Creek fault.



Map of Regional Seismic Sources
Figure 3.3-2

TABLE 3.3-1

Main Earthquake Sources in the Region

Fault	Maximum Magnitude, M_w	Site-to-source Distance, Miles	Activity[1]
Hayward-Rodgers Creek	7 ¼	0.3	Active
Mt. Diablo Thrust	6 ¾	17	Active
Concord-Green Valley	6 ¾	22	Active
Northern Calaveras	7	19	Active
San Andreas	8	29	Active
Greenville	7	36	Active
San Gregorio-Seal Cove	7 ½	36	Active

Note: (1) Defined in accordance with DSOD guidelines.

Attenuation Relationships

Attenuation relationships refer to the relationship between earthquake magnitude, location and distance from a project site. **Table 3.3-2** lists the three selected relationships along with their magnitude and distance definitions and limits of applicability (Abrahamson and Silva 1997; Sadigh et al, 1007; Boore et al, 1997). The site conditions assumed for each relationship are also listed in the table. Use of the relationship by Boore et al (1997) for the San Andreas fault maximum credible earthquake (MCE) required slight extrapolation beyond the limits of applicability. The selected attenuation relationships were weighted equally for developing the design ground motions. The calculated horizontal peak ground accelerations at 84th percentile are summarized in **Table 3.3-3.**

TABLE 3.3-2

Selected Attenuation Relationships

Attenuation Relationship	Definitions		Limits of Applicability		Site Condition
	Magnitude	Distance	Magnitude	Distance	
Abrahamson and Silva (1997)	M_w[1]	R_{rup}[2]	(see note 4)	(see note 4)	Rock
Sadigh et al. (1997)	M_w[1]	R_{rup}[2]	$4.0 \leq M_w \leq 8+$	$R_{rup} \leq 100$ km	Rock
Boore et al. (1997)	M_w[1]	R_{jb}[3]	$5.5 \leq M_w \leq 7.5$	$R_{jb} \leq 80$ km	V_s=650 m/s

Note: 1 = Moment magnitude.
2 = Closest distance to rupture surface.
3 = Closest horizontal distance to vertical project of rupture surface.
4 = Not stated by authors of the relationship; assumed applicable up to M_w8+, and to the site-to-source distances, based on range of data used for its development.

TABLE 3.3-3
Calculated Horizontal Peak Ground Acceleration

MCE	M_W	Distance, km	Calculated 84th-% Horizontal Peak Ground Acceleration, g			
			AS97	SD97	BR97	Mean
Hayward-Rodgers Creek	7 1/4	0.3	1.25	1.10	0.83	1.06
San Andreas	8.0	29	0.33	0.37	0.34	0.35
Mt. Diablo Thrust	6 3/4	17	0.34	0.35	0.26	0.32
Concord-Green Valley	6 3/4	22	0.26	0.27	0.21	0.25
Northern Calaveras	7	19	0.32	0.34	0.27	0.31
Greenville	7	36	0.17	0.17	0.17	0.17
San Gregorio-Seal Cove	7 1/2	36	0.22	0.23	0.22	0.22

Note: AS97= Abrahamson and Silva (1997). SD97 = Sadigh et al.(19997). BR 97 = Boore et al (1997).

Seismic Hazards

Primary Hazards

Surface Fault Rupture - Seismically induced ground rupture is defined as the physical displacement of surface deposits in response to an earthquake's seismic waves. The magnitude and nature of fault rupture can vary for different faults or even along different strands of the same fault. Ground rupture is considered more likely along active faults, which are referenced in **Table 3.3-1.**

The Estates Reservoir site is not within an Alquist-Priolo Earthquake Fault Zone, as mapped and designated through the Alquist Priolo Earthquake Fault Zoning Act, and no mapped active faults are known to pass through the immediate Project site (Lienkaemper, 1992). Therefore the risk of ground rupture at the Estates site is considered low.

Groundshaking - Earthquakes in the Bay Area could produce strong groundshaking in the Project region. Groundshaking intensity is partly related to the size of an earthquake, the distance to the site, and the response of the geologic materials that underlie a site. As a rule, the greater the earthquake magnitude and the closer the fault rupture to a site, the greater the intensity of groundshaking. Violent groundshaking is generally expected at and near the epicenter of a large earthquake; however, different types of geologic materials respond differently to earthquake waves. For instance, deep unconsolidated materials can amplify earthquake waves and cause longer periods of groundshaking.

While the magnitude is a measure of the energy released in an earthquake, intensity is a measure of the observed groundshaking effects at a particular location. The Modified Mercalli (MM) scale is commonly used to measure earthquake intensity due to groundshaking. **Table 3.3-4** presents a description of the MM scale. The MM values for intensity range from I (earthquake not felt) to XII (damage nearly total). MM intensities

ranging from IV to X can cause moderate to significant structural damage, although the damage will not be uniform. Some structures experience substantially more damage than others. The age, material, type, method of construction, size, and shape of a structure affect its performance in an earthquake.

TABLE 3.3-4
Modified Mercalli Intensity Scale
Intensity, G-Value, Intensity Description and Average Peak Acceleration (% G)

I	Not felt except by a very few persons under especially favorable circumstances.	< 0. 17
II	Felt only by a few persons at rest, especially on upper floors on buildings. Delicately suspended objects may swing	0.17–1.4
III	Felt noticeably indoors, especially on upper floors of buildings, but many people do not recognize it as an earthquake. Standing motor cars may rock slightly, vibration similar to a passing truck.	0.17–1.4
IV	During the day felt indoors by many, outdoors by few. At night, some awakened. Dishes, windows, doors disturbed; walls make cracking sound. Sensation like heavy truck striking building. Standing motor cars rocked noticeably.	1.4–3.9
V	Felt by nearly everyone, many awakened. Some dishes and windows broken; a few instances of cracked plaster; unstable objects overturned. Disturbances of trees, poles may be noticed. Pendulum clocks may stop.	3.9–9.2
VI	Felt by all, many frightened and run outdoors. Some heavy furniture moved; and fallen plaster or damaged chimneys. Damage slight.	9.2–18
VII	Everybody runs outdoors. Damage negligible in buildings of good design and construction; slight to moderate in well-built ordinary structures; considerable in poorly built or badly designed structures; some chimneys broken. Noticed by persons driving	18–34
VIII	Damage slight in specially designed structures; considerable in ordinary substantial buildings, with partial collapse; great in poorly built structures. Panel walls thrown out of frame structures. Fall of chimneys, factory stacks, columns, monuments, walls. Heavy furniture overturned. Sand and mud ejected in small amounts. Changes in well water. Persons driving motor cars disturbed.	34–65
IX	Damage considerable in specially designed structures; well-designed frame structures thrown out of plumb; great in substantial buildings, with partial collapse. Buildings shifted off foundations. Ground cracked. Underground pipes broken.	65–124
X	Some well-built wooden structures destroyed; most masonry and frame structures destroyed with foundations; ground badly cracked. Rails bent. Landslides considerable from riverbanks and steep slopes. Shifted sand and mud. Water splashed over banks.	> 124
XI	Few, if any, masonry structures remain standing. Bridges destroyed. Broad fissures in ground. Underground pipelines completely out of service. Earth slumps and land slips in soft ground. Rails bent greatly.	> 124
XII	Damage total. Practically all works of construction are damaged greatly or destroyed. Waves seen on ground surface. Lines of sight and level are distorted. Objects are thrown upward into the air.	> 1.24

Note: One G (gravitational acceleration) = 980 centimeters per second squared = a rate of increase in speed equivalent to a car traveling 328 feet from rest in 4.5 seconds. SOURCE: ABAG, 2003; CGS, 2003.

As a comparison, the 1906 San Francisco earthquake, with an M 7.9 on the San Andreas Fault, produced shaking intensities modeled to range from moderate (MM VI) to strong (MM VII) within the Project area. The 1989 Loma Prieta earthquake, with an M 7.1 near the San Andreas Fault, produced light (MM V) to moderate (MM VI) shaking intensities (AGS, Inc., 2005).

Ground motion during an earthquake can also be described using the motion parameters of acceleration, velocity, and duration of shaking. A common measure of ground motion is the peak ground acceleration (PGA). The PGA for a given component of motion is the largest value of horizontal acceleration obtained from a seismograph. PGA is expressed as the percentage of the acceleration due to gravity (g), which is approximately 980 centimeters per second squared. For comparison purposes, the maximum peak acceleration value recorded during the Loma Prieta earthquake was in the vicinity of the epicenter, near Santa Cruz, at 0.64 g. The lowest recorded value was 0.06 g in the bedrock on Yerba Buena Island. The highest value measured in the Contra Costa County area was 0.13 g (California Division of Mines and Geology [CDMG], 1990). However, an earthquake on the nearby Hayward Fault would likely produce far more severe groundshaking in the Project area than was observed during the Loma Prieta earthquake. **As Table 3.3-3** shows, calculations indicate that the PGA could reach as high as 1.06 g in the Project region (AGS, Inc., 2005).[5]

Secondary Hazards

Secondary earthquake hazards in the Project region include earthquake-induced landslides, settlement, and liquefaction. Strong ground motions that occur during earthquakes are capable of inducing landslides and related forms of ground failure. Settlement is the gradual downward movement of an engineered structure (such as a building) due to the compaction of unconsolidated material below the foundation. Settlement accelerated by earthquakes can result in vertical or horizontal separations of structures or portions of one structure; cracked foundations, roads, sidewalks, and walls; and, in severe situations, building collapse and bending or breaking of underground utility lines. Soil liquefaction (a phenomenon in which soils lose strength) can result in ground failure. The soils most susceptible to liquefaction are clean, loose, uniformly graded, saturated, fine-grained soils that occur close to the ground surface, usually at depths of less than 50 feet. In general, upland areas have a low liquefaction potential, except where significant alluvium is present in creek bottoms or swales.

Earthquake motions can induce significant horizontal and vertical dynamic stresses in slopes that can trigger failure. Earthquake-induced landslides can occur in areas with

[5] PGA values were calculated using a deterministic seismic hazard assessment approach. First, the faults near a site are identified and assessed for activity. Then, for each seismic source, an earthquake scenario consisting of the maximum magnitude a fault is capable of generating at the closest distance to the site is used to determine the ground motion estimate.)

steep slopes that are susceptible to strong ground motion during an earthquake. The 1989 Loma Prieta earthquake triggered thousands of landslides over an epicentral area of 770 square miles. The Oakland-Berkeley Hills could experience some earthquake-induced rockfalls, slumps, and debris flows during an event on the Hayward Fault or other active Bay Area fault capable of generating strong ground motion. There is no mapped or known active landslide in the Project area; therefore the likelihood of experiencing a secondary earthquake hazard at the Estates site is very low.

3.3.3 Impacts and Mitigation Measures

Significance Criteria

In accordance with Appendix G of the CEQA Guidelines, a geologic or seismic impact is considered significant if it would:

- Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:
  - Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault
  - Strong seismic ground shaking
  - Seismic-related ground failure, including liquefaction
  - Landslides
- Result in substantial soil erosion or the loss of topsoil;
- Be located on a geologic unit or soil that is unstable or that would become unstable as a result of the Project, and potentially result in on-site or off-site landslide, lateral spreading, subsidence (i.e., settlement), liquefaction, or collapse;
- Be located on expansive soil, as defined in Table 18-1 -B of the Uniform Building Code (1994), creating substantial risks to life or property;
- Have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater;
- Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state; or
- Result in the loss of availability of a locally important mineral resource recovery site delineated on a local General Plan, Specific Plan, or other land use plan.

Based on the geologic environment in the Project area, the proposed Project would not be impacted by fault rupture, ground shaking, liquefaction, expansive soil, wastewater disposal, or mineral resources. No impact discussion is provided for these topics for the following reasons:

- **Fault Rupture -** The faults most susceptible to earthquake rupture are active faults, which are faults that have experienced surface displacement within the last 11,000 years. There is no known active fault crossing the Project site. The nearest active

fault (Hayward-Rodgers Creek) is approximately 900 feet to the east of the site, based on maps produced (**Figure 3.3-1**). Therefore, the potential for fault rupture to affect the proposed Project is very low.

- **Ground Shaking -** One purpose of the Project is to eliminate any seismic instability of the existing dam. Therefore, the Project itself would significantly reduce the potential for injury and damage from ground shaking and is considered a beneficial impact.
- **Liquefaction -** Existing materials beneath the dam and the reservoir basin are not susceptible to liquefaction (URS, 2006).
- **Expansive Soil** - The new concrete tanks will either be supported by pier foundations or engineering fill embedded in bedrock. Any expansive soil at the site would not affect the structural performance or cause potential risk to life or property.
- **Wastewater Disposal -** None of the Project elements require the use of septic or other alternative disposal wastewater systems; therefore, no impact associated with this hazard would result.
- **Mineral Resources -** None of the Project elements would alter, destroy, or limit access to any existing mineral resources.

Impacts and Mitigation Measures

Impact 3.3-1: New slopes associated with reservoir construction may be potentially unstable.

The proposed Project will entail excavation of the existing ground and dam embankment and will create temporary cut slopes and new fill slopes around the tanks. Without adequate design, the new slopes may be unstable, a significant impact.

Measure 3.3-1: During the design phase, EBMUD will perform a geotechnical evaluation and, if required, conduct site-specific geotechnical investigations to reduce or eliminate potential slope hazards. Design and construction specifications will incorporate the recommendations from the geotechnical evaluation for any slope stabilization, which may include some of the following measures, although this list is not exclusive:

- Appropriate slope inclination
- Slope terracing
- Fill compaction
- Soil reinforcement
- Surface and subsurface drainage facilities
- Retaining walls
- Buttresses
- Erosion control measures
  - Soil nails or anchors
  - Sub drain system

Significance after Mitigation: Less than Significant.

Impact 3.3-2: Facility damage or service interruptions resulting from strong ground shaking.

Ground shaking can be a serious hazard to structures and the associated infrastructure if not adequately designed and constructed. This Project would likely experience at least one major earthquake (greater than M 6.7) sometime during its operational lifetime (United States Geological Survey [USGS}, 2003). The degree of hazard depends on the geologic conditions of the site, construction approaches and quality. The intensity of the ground shaking depends on the size of the causative fault, the distance to the epicenter, the magnitude of the earthquake, and the duration of the shaking.

The 1989 Loma Prieta earthquake reportedly caused more than 60 water pipeline breaks in Santa Cruz, the nearest urbanized area to the epicenter (CDMG, 1990). After the quake, EBMUD initiated a seismic evaluation program to identify seismic safety concerns of the water system and develop facility improvements. As a result of the seismic evaluation program, EBMUD has reduced the overall vulnerability of the water system to earthquakes. Current building codes and construction practices can largely reduce damage from an earthquake. Any potential interruption of service would likely be temporary in nature. With implementation of the measure identified below, this significant impact would be reduced to a less than significant level.

> **Measure 3.3-2**: During the design phase, EBMUD will perform a geotechnical evaluation and, if required, conduct site-specific geotechnical investigations investigation and evaluations to identify the potential for secondary ground failure hazards (i.e., seismically-induced settlement). The geotechnical evaluation will provide recommendations for applicable settlement mitigation measures to be incorporated in the design and construction specifications for the replacement tanks.

Significance after Mitigation: Less than Significant.

Impact 3.3-3: Facility damage resulting from settlement or uplift caused by compressible soils.

The reservoir basin is generally underlain by colluvial, residual and/or fill soils that are not competent to support the proposed tank structures. The tank structures may undergo unacceptable settlement and damage if they rely solely on these soils for foundation support, a significant impact.

> **Measure 3.3-3a:** The tank structures will be supported by 1) select engineered fill founded on bedrock after removal of the soils above the bedrock or 2) cast-in-place concrete pier foundations obtaining vertical support from the bedrock. These measures will reduce the potential settlement to within the acceptable limits.

Measure 3.3-3b: EBMUD will include in the contract specifications that any fill will be selected, placed, compacted, and inspected in accordance with plans and specifications prepared by a licensed professional engineer.

Significance after Mitigation: Less than Significant.

Impact 3.3-4: Exposure of soils to erosion after removal of the concrete lining within the existing reservoir basin.

Colluvial, residual and/or fill soils in the reservoir basin directly under the concrete lining may be subject to surface water erosion after the lining is removed**,** a significant impact.

Measure 3.3-4: Grading for the reservoir construction will be performed in compliance with the Stormwater Pollution Prevention Plan to control/manage soil erosion and run-off. During grading construction, sprinkling will be performed regularly to control dust at the site. Measures for winterization, including hydro-mulching, straw bale installation, and/or other measures will be performed to minimize soil erosion during the rainy seasons.

Significance after Mitigation: Less than Significant.

Impact 3.3-5: Stockpiled materials from excavation of the existing dam or import could cause localized instability of slopes.

Excessive accumulation of stockpiled materials on hillsides or slopes may be vulnerable to failure, or may cause sliding of the native ground if the stockpiling is not properly designed or adequately placed, a significant impact.

Measure 3.3-5: Due to the limited construction working space at the site, stockpiling of imported or locally excavated materials will be minimized. In general, imported materials will be placed directly at the intended fill areas and excavated materials from the site not proposed for reuse on-site will be off hauled shortly after excavation.

Significance after Mitigation: Less than Significant.

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3.4 Biological Resources

3.4.1 Approach to Analysis

This section describes the existing biological resources at or around the Project site and potential impacts to these resources from the Project. Sources of information used to prepare this report include: reconnaissance-level and focused biological field surveys, a query of the California Department of Fish and Game (CDFG) California Natural Diversity Database (CNDDB) and biological literature (see the references cited at the end of this section).

3.4.2 Setting/Regulatory Framework

The 6.7 acre Estates Reservoir site is located at 6317 Estates Drive in Oakland near Highway 13. The reservoir site is set within a residential community and is completely encircled by homes. The reservoir site consists of a covered earthen reservoir and a small pumping plant on the downhill side. The perimeter of the reservoir is bordered by a 20-foot wide access road. A landscaped strip of approximately 50 feet is present between the access road and Estates Drive, which surrounds more than half of the facility perimeter. The landscaped strip consists mostly of ornamental shrubs and a mix of trees including native species. Trees and shrubs are pruned annually in response to the City of Oakland Fire Department's Fire Abatement Program. Additional pruning may be required during construction to establish or maintain a defined staging area. Approximately 55 percent of the total site area is covered with vegetation, as shown in **Figure 3.2-2**.

The proposed Project is comprised of two 3.3-million gallon (MG) tanks that will be constructed entirely within the boundaries of the current reservoir structure (open-cut bowl). The tanks will be buried so that they will be at a lower height than the current covered reservoir. Most Project impacts will be limited to the footprint of the existing reservoir structure. Grading will be required on the landscaped slope on the south side of the reservoir, between the current reservoir access road and the maintenance road to the pump house below. Material cut from this area will be used as fill around the new tanks. A detailed description of the proposed Project is contained in Chapter 2 of this EIR (Project Description).

Field Survey of Site Biology

On August 5, 2008, Bert Mulchaey, East Bay Municipal Utility District (EBMUD) Fisheries and Wildlife Biologist II, and Thomas Newcomb, EBMUD Fisheries Aide, participated in a field survey to examine the proposed Estates Reservoir rebuild. An additional site survey was performed by Bert Mulchaey on August 19, 2008. Botanist Dianne Lake surveyed the site on August 21, 2008 and produced a comprehensive list of plants observed **(Table 3.4-1).** Wildlife Biologist/Raptor Specialist Gary Beeman surveyed the site for raptor nests on August 29, 2008. Surveys included identification of species present, and an evaluation of potential presence of special status species habitat within the Project site.

TABLE 3.4-1
Plants Observed at Estates Reservoir, Piedmont, California
August 21, 2008

Species	Common Name	Species	Common Name
Acacia sp.	Acacia	Lactuca saligna	Willow lettuce
Anagallis arvensis	Scarlet pimpernel	Lactuca serriola	Prickly lettuce
Baccharis pilularis	Coyote brush	Lactuca virosa	Wild lettuce
Bromus diandrus	Ripgut brome	Medicago polymorpha	Burclover
Bromus hordeaceus	Soft chess	Picris echioides	Bristly ox-tongue
Bromus madritensis ssp. madritensis	Spanish brome	Pittosporum sp.	Pittosporum
Cedrus atlantica	Atlas cedar	Pinus ponderosa	Pacific ponderosa pine
Cirsium vulgare	Bull thistle	Prunus spp.	Plum/cherry
Cotoneaster sp.	Cotoneaster	Pyracantha sp.	Firethorn
Cupressus spp	Cypress	Quercus agrifolia	Coast live oak
Gastridium ventricosum	Nit grass	Rubus discolor	Himalayan blackberry
Hedera helix	English ivy	Rubus ursinus	California blackberry
Heteromeles arbutifolia	Toyon	Sequoia sempervirens	Coast redwood
Hordeum murinum ssp. leporinum	Farmer's foxtail	Sonchus oleraceus	Sow thistle
Juniperus sp.	Juniper	Torilis arvensis	Hedge parsley
Kickxsia elatine	Fluellin	Vicia sativa ssp. nigra	Common vetch

Also present were 3 ornamental species not identifiable at the time of the survey

Special-Status Species

This section describes the federal and state regulations, policies, and codes that afford certain species this status and protection.

Federal Endangered Species Act

Under the Federal Endangered Species Act (FESA), the Secretary of the Interior and the Secretary of Commerce jointly have the authority to list a species as threatened or endangered (16 United States Code [USC] 1533[c]). Pursuant to the requirements of FESA, a federal agency reviewing a proposed project within its jurisdiction must determine whether any federally listed threatened or endangered species may be present in the project area and determine whether the proposed project will have a potentially significant impact on such species. In addition, the agency is required to determine whether the project is likely to jeopardize the continued existence of any species proposed to be listed under FESA or result in the destruction or adverse modification of critical habitat proposed to be designated for such species (16 USC 1536[3], [4]). Project-related impacts to these species or their habitats would be considered significant in this EIR. The United States Fish and Wildlife Service (USFWS) also publishes a list of candidate species. Species on this list receive special attention from federal agencies during environmental review, although they are not protected otherwise under FESA.

The candidate species are taxa for which the USFWS has sufficient biological information to support a proposal to list as endangered or threatened. Project impacts to such species would be considered significant in this EIR.

California Endangered Species Act

Under the California Endangered Species Act (CESA), the CDFG has the responsibility for maintaining a list of threatened species and endangered species (CDFG Section 2070). The CDFG also maintains a list of candidate species, which are species that the CDFG has formally noticed as under review for addition to the threatened or endangered species lists. The CDFG also maintains lists of species of special concern that serve as watch lists. Pursuant to the requirements of CESA, an agency reviewing a proposed project within its jurisdiction must determine whether any state-listed endangered or threatened species may be present in the project area and determine whether the proposed project will have a potentially significant impact on such species. In addition, the CDFG encourages informal consultation on any proposed project that may affect a candidate species. Project-related impacts to species on the CESA endangered list and threatened list would be considered significant in this EIR. Impacts to species of concern would be considered significant under certain circumstances.

CEQA Guidelines Section 15380

Although threatened and endangered species are protected by specific federal and state statutes, CEQA Guidelines Section 15380(b) provides that a species not listed on the federal or state list of protected species may be considered rare or endangered if the species can be shown to meet certain specified criteria. These criteria have been modeled after the definition in FESA and the section of the CDFG Code dealing with rare or endangered plants or animals. This section was included in the CEQA Guidelines primarily to deal with a situation in which a project may have a significant effect on a species that has not yet been listed by either the USFWS or CDFG. Thus, CEQA provides the ability to protect a species from potential project impacts until the respective government agencies have an opportunity to designate the species as protected, if warranted.

CEQA also calls for the protection of other locally or regionally significant resources, including natural communities. Although natural communities do not at present have legal protection, CEQA calls for an assessment of whether any such resources would be affected, and requires a finding of significance if there would be substantial losses. Natural communities listed in the CNDD as “high priority for inventory” are considered by CDFG to be significant resources and fall under the CEQA Guidelines for addressing impacts. Local planning documents such as General Plans often identify these resources as well.

Other Statutes, Codes, and Policies Affording Limited Species Protection

Migratory Bird Treaty Act/CDFG Code - The Migratory Bird Treaty Act (16 USC, Section 703, Supp. I, 1989) prohibits killing, possessing, or trading in migratory birds, except in accordance with regulations prescribed by the Secretary of the Interior. This act encompasses whole birds, parts of birds, and bird nests and eggs. Birds of prey are protected in California under the CDFG Code (Section 3503.5, 1992). Section 3503.5 states that it is "unlawful to take, possess, or destroy any birds in the order Falconiformes or Strigiformes (birds of prey) or to take, possess, or destroy the nest or eggs of any such bird except as otherwise provided by this code or any regulation adopted pursuant thereto." Construction disturbance during the breeding season could result in the incidental loss of fertile eggs or nestlings, or otherwise lead to nest abandonment. Disturbance that causes nest abandonment and/or loss of reproductive effort is considered "taking" by the CDFG. Any loss of fertile eggs, nesting raptors, or any activities resulting in nest abandonment would constitute a significant impact. Non-raptor native birds receive similar protection under CDFG Code Section 3503. Project impacts to these species would not be considered significant unless the species are known to, or have a high potential to, nest in the Estates Reservoir Project area or rely on it for primary foraging.

Plants - The legal framework and authority for the state's program to conserve plants are woven from various legislative sources, including CESA, the California Native Plant Protection Act (Fish and Game Code Sections 1900–1913), the CEQA Guidelines, and the Natural Communities Conservation Planning Act.

The Native Plant Protection Act of 1977 (Fish and Game Code Sections 1900 et seq.) gives the CDFG authority to designate state endangered, threatened, and rare plants and provides specific protection measures for identified populations. Sensitive plant and wildlife species that are not currently listed but would qualify for listing are afforded protection under CEQA. CEQA Guidelines Section 15065 ("Mandatory Findings of Significance") requires that a reduction in numbers of a rare or endangered species be considered a significant effect. CEQA Guidelines Section 15380 ("Rare or Endangered Species") provides for the assessment of unlisted species as rare or endangered under CEQA if the species can be shown to meet the criteria for listing. The California Native Plant Society (CNPS) maintains a list of special-status plant species based on collected scientific information. Designation of these species by the CNPS has no legal status or protection under federal or state endangered species legislation. CNPS designations are defined as follows: List 1A (plants presumed extinct); List 1B (plants rare, threatened, or endangered in California and elsewhere); List 2 (plants rare, threatened, or endangered in California, but more numerous elsewhere); List 3 (plants about which more information is needed – a review list); and List 4 (plants of limited distribution – a watch list). In general, plants appearing on CNPS List 1A, 1B, or 2 meet the criteria of Section 15380 of the CEQA Guidelines; thus, substantial adverse effects to these species would be considered significant in this EIR.

Wetlands

United States Army Corps of Engineers (Corps) - Wetlands and other waters (e.g., rivers, streams, and natural ponds) are a subset of "waters of the United States."[6] and receive protection under Section 404 of the Clean Water Act. The Corps has primary federal responsibility for administering regulations that concern waters of the United States. In this regard, the Corps acts under two statutory authorities: the Rivers and Harbors Act (Sections 9 and 10), which governs specified activities in "navigable waters,"[7] and the Clean Water Act (Section 404), which governs specified activities in waters of the United States., including wetlands. The United States Environmental Protection Agency (USEPA) has the ultimate authority for designating dredge and fill material disposal sites and can veto the Corps issuance of a permit to fill jurisdictional waters of the United States. The Corps requires a permit if a project proposes placement of structures within navigable waters and/or alteration of waters of the United States.[8]

Regional Water Quality Control Board (RWQCB) - The RWQCB regulates waters of the state under the Porter-Cologne Water Quality Control Act. Under Section 401 of the Clean Water Act, the RWQCB has review authority of Section 404 permits. The RWQCB has a policy of no-net-loss of wetlands and typically requires mitigation for impacts to wetlands before it will issue a water quality certification. Dredging, filling, or excavation of isolated waters constitutes a discharge of waste to waters of the state, and prospective dischargers are required to submit a report of waste discharge to the RWQCB and comply with other requirements of the Porter-Cologne Water Quality Control Act. CDFG under Sections 1600–1616 of the CDFG Code, the CDFG regulates activities that substantially divert, obstruct the natural flow of, or substantially change rivers, streams,

[6] The term "waters of the United States," as defined in Code of Federal Regulations (33 CFR 328.3[a]; 40 CFR 230.3[s]), includes: (1) all waters that are currently used, were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters that are subject to the ebb and flow of the tide; (2) all interstate waters, including interstate wetlands; (3) all other waters, such as intrastate lakes, rivers, streams (including intermittent streams), mud flats, sand flats, wetlands, sloughs, prairie potholes, wet meadows, playa lakes, or natural ponds, the use, degradation, or destruction of which could affect interstate or foreign commerce, including any such waters that are or could be used by interstate or foreign travelers for recreational or other purposes; or from which fish or shellfish are or could be taken and sold in interstate or foreign commerce; or which are used or could be used for industrial purposes by industries in interstate commerce; (4) all impoundments of waters otherwise defined as waters of the U.S. under the definition; (5) tributaries of waters identified in numbers (1) through (4); (6) territorial seas; and (7) wetlands adjacent to waters (other than waters that are themselves wetlands) identified in numbers (1) through (6).

[7] Navigable waters are defined as those waters that are subject to the ebb and flow of the tide or that are presently used, have been used in the past, or may be susceptible for use to transport interstate or foreign commerce.

[8] Based on a Supreme Court ruling concerning the Clean Water Act jurisdiction over isolated waters (January 9, 2001), nonnavigable, isolated, intrastate waters, based solely on the use of such waters by migratory birds, are no longer defined as waters of the U.S. Jurisdiction over nonnavigable, isolated, intrastate waters may be possible if their use, degradation, or destruction could affect other waters of the U.S., or interstate or foreign commerce. Jurisdiction over such other waters is analyzed on a case-by-case basis. Impoundments of waters, tributaries of waters, and wetlands adjacent to waters is also analyzed on a case-by-case basis.

and lakes. The jurisdictional limits of the CDFG are defined in Section 1602 of the California Fish and Game Code as the bed, channel, or bank of any river, stream, or lake. The CDFG regulates activities that would result in the deposit or disposal of debris, waste, or other materials into any river, stream, or lake and requires a Streambed Alteration Agreement for such activities. For purposes of determining significance in this EIR, impacts to the resource areas subject to the jurisdiction of CDFG would be considered significant.

Oak Woodlands Conservation Act

California Senate Bill 1334, the Oak Woodlands Conservation Act, became law on January 1, 2005 and was added to the CEQA statutes as Section 21083.4. This new law, applicable to counties but not to cities or other public agencies, protects oak woodlands that are not protected under the State Forest Practice Act. This statute requires that a county determine whether or not a project would result in a significant impact on oak woodlands; if the project would result in a significant impact on oak woodlands, the county must implement one or more of the following mitigation measures:

- Conserve oak woodlands through the use of conservation easements.
- Plant an appropriate number of trees, including maintenance of plantings and replacement of failed plantings.
- Contribute funds to the Oak Woodlands Conservation Fund for the purpose of purchasing oak woodlands conservation easements.
- Implement other mitigation measures developed by Alameda County.
- Alameda County has developed additional measures for trees in the County right-of-way known as the County's "Tree Ordinance", as defined in the County Code (*Regulation of Trees in County Right-of-Way*, Ordinance number: 0-2004-23, Title 12, Chapter 12.11).

Local Tree Ordinances

Pursuant to California Government Code Section 53091, EBMUD, as a local agency and utility district serving a broad regional area, is not subject to building and land use zoning ordinances (such as tree ordinances) for projects involving facilities for the production, generation, storage or transmission of water. However, it is the practice of EBMUD to work with host jurisdictions and neighboring communities during project planning and to conform to local environmental protection policies to the extent possible. The tree ordinance of the City of Oakland is addressed in section 3.4-4, below.

Plant Communities and Wildlife Habitats at Estates Reservoir Site

The Project site has no natural plant communities as defined by *A Manual of California Vegetation* (Sawyer and Keeler-Wolf, 1995). Nearly all shrubs and trees on the site were planted to create a visual barrier to mitigate the visual impact of the covered reservoir on the surrounding community. The site is actively landscaped and surrounded by

residential housing, making it unlikely that native plants would be present. No rare plant species were observed during surveys. The entire property has been landscaped with ornamentals and exotic and native tree species with Coast live oak (*Quercus agrifolia*) sparsely distributed on the site. The site is dominated by Cotoneaster (Cotoneaster sp.), Cypress (Cupressus spp.), Firethorn (Pyracantha sp.) and Juniper (Juniperus sp.).

The dominance of introduced plant species on the site provides poor habitat for sensitive wildlife species. Estates Reservoir is completely surrounded by residential development and is not a significant corridor for wildlife.

Aquatic Habitats

There is no aquatic habitat in the Project area.

Special-Status Species Assessment

For the purpose of this EIR, special status species include plant and wildlife species listed as rare, threatened or endangered under the federal and state endangered species acts, candidate species, state and federal species of concern, and plants on the CNPS lists for CEQA consideration (List 1A, 1B, or 2).

The site was surveyed for sensitive species on August 5 and 19, 2008. The description of the wildlife species potentially occurring within the Project location is based on observation of individuals and/or species sign, analysis of the CNDDB, and discussion with area biologists. Species or species sign observed at the site include only black-tailed deer (*Odocoileus hemionus*). No species listed as threatened, endangered, species of special concern by the CDFG, or sensitive species by the CNPS were observed.

Queries of the CNDDB indicate that three special status species have been recorded within one mile of the Estates Reservoir Project area. These are: fragrant fritillary (*Fritillaria liliacea*) silver-haired bat *(Lasionycteris noctivagans)*, and Bay checkerspot butterfly (*Euphydryas editha bayensis).* There is a one-mile buffer for point records for these species in the CNDDB. Habitat on the Project site is not suitable for these species and they are not likely present. The Bay checkerspot butterfly is listed as extirpated in the area and the host plant for this species is not present on the site or nearby.

Trees on site have the potential to provide nesting habitat for birds from February through July. No bird nests were observed on site during sensitive species surveys or the raptor survey conducted by Gary Beeman.

There are no approved habitat conservation plans in the Project vicinity. Therefore, no further discussion of this topic is provided.

3.4.4 Impacts and Mitigation Measures

Significance Criteria

For the purposes of this EIR and consistent with Appendix G of the CEQA Guidelines, a project is considered to have a significant impact if it would result in:

- Substantial adverse effects to any species identified as a threatened, endangered, candidate, sensitive, or special-status species in local or regional plans, policies, regulations or by lists of species of concern from the CDFG, USFWS, or as defined by Section 15380 of the CEQA Guidelines;
- Substantial adverse effects to habitat (including habitats for rare and endangered species, as defined by Fish and Game Code 903) or other sensitive natural community identified in local or regional plans, policies, regulations, or by lists compiled by the CDFG or USFWS;
- Substantial adverse effects to federally protected wetlands (including but not limited to marshes and riparian areas), as defined by Section 404 of the Clean Water Act, or riparian and marsh areas under the jurisdiction of the CDFG, as defined by Fish and Game Codes 1601–1603;
- Substantial interference with movement of any native resident or migratory fish or wildlife species or with established migration or dispersal corridors;
- Removal or damage to trees considered protected; or
- Conflicts with any applicable habitat conservation plan.

Local Plans and Policies

As discussed above, it is the practice of EBMUD to work with host jurisdictions and neighboring communities during project planning and to conform to local environmental protection policies to the extent possible. For the purpose of this EIR, tree ordinance policies of the City of Oakland that define protected trees, including heritage trees, are also used as guidelines for determining significance criteria.

Impacts and Mitigation Measures

Impact 3.4-1: Loss of or damage to protected trees.

Title 12, Chapter 12.36 of the City of Oakland Municipal code identifies protected trees, including coast live oaks measuring four inches in diameter at standard height; any other tree measuring nine inches at standard height or greater, except eucalyptus and Monterey pine trees; and an area of more than five Monterey pine trees per acre, measuring at least nine inches in diameter at breast height. The removal of five or fewer Monterey pines per acre is not regulated by the Oakland ordinance.

No protected trees that are subject to the City of Oakland's tree ordinance will be removed for this Project. One small oak (3 inches in diameter at breast height) on the

south slope of the reservoir may be removed for grading work, as a result of lowering the height of the dam embankment. This tree will be replaced on at least a 3:1 basis. The Project landscape plan outlined in the RHAA Estates Reservoir Concept Design Process and Recommendations Report 2008 (updated 2009) will incorporate native trees such as Coast live oak, California buckeye (*Aesculus californica*) and California sycamore (*Platanus racemosa*) in numbers sufficient to compensate for the removal of this one tree, and the impact is less than significant. The landscape plan also includes extensive use of native shrubs and grasses.

> **Measure 3. 4-1:** EBMUD will develop and implement a five-year tree monitoring program. Appropriate performance standards may include, but are not limited to a not less than 75 percent survival rate of replacement tree plantings and a requirement that trees be able to be self-sustaining at the end of five years.

Significance after Mitigation: Less than Significant.

Impact 3.4-2: Disturbances to nesting raptors or special status nesting birds.

Impacts to raptors and other nesting birds will be limited, if any. All large, mature trees on site will remain and only a few small trees will be removed when the height of the dam embankment is reduced. The removal of several trees and shrubs on the south slope behind the reservoir has the potential to result in direct mortality of native birds (and nests) which are protected during nesting under the California Fish and Game Code. In addition, human disturbances and construction noise during the breeding season (including clearing, grading, trimming, and removal of trees, shrubs, and other nesting habitat for pipelines, bore-and-jack pits, and project facilities) could cause nest abandonment and death of young at active nests around the perimeter of the Project area.

These impacts could be significant. Implementation of Measure 3.4-2 would reduce these impacts to raptors and special-status bird species to a less than significant level.

> **Measure 3.4-2:**
>
> - EBMUD will avoid disturbing active nests of special-status nesting birds by performing preconstruction surveys and creating no-disturbance buffers. If construction activities (i.e., ground clearing and grading, including removal of trees or shrubs) are scheduled to occur during the nonbreeding season (September 1 through January 31), no mitigation is required.
> - If construction activities are scheduled to occur during the breeding season (February 1 through August 31), EBMUD will implement the following measures to avoid potential adverse effects on nesting raptors and other special-status birds.

- EBMUD will retain a qualified wildlife biologist to conduct preconstruction surveys of all potential nesting habitat within 500 feet of construction activities where access is available.
- If active nests are found during preconstruction surveys, EBMUD will create a no-disturbance buffer (acceptable in size to the CDFG) around active raptor nests and nests of other special-status birds during the breeding season, or until it is determined that all young have fledged. The size of these buffer zones and types of construction activities restricted in these areas will be based on existing noise and human disturbance levels at the Estates Reservoir Project site. Nests initiated during construction are presumed to be unaffected by the activities occurring , and no buffer would be necessary.
- If preconstruction surveys indicate that nests are inactive or potential habitat is unoccupied during the construction period, no further mitigation is required. Trees and shrubs within the construction footprint that have been determined to be unoccupied by special-status birds or that are located outside the no-disturbance buffer for active nests may be removed.

Significance after Mitigation: Less than Significant.

Impact 3.4-3: Loss or damage to special–status plants and sensitive natural communities

The Estates Reservoir site is within a large-scale, well established residential neighborhood and has been maintained as a manicured landscape for several decades. Ornamental vegetation on the site and in the surrounding neighborhood has decreased (if not eliminated) the value of on-site vegetation for native wildlife habitat. The Estates Reservoir Project will therefore not have a significant adverse impact on biological resources, or to special status/sensitive plants and communities. Because of the extensive grass, shrub and tree planting proposed as part of the Project, the Project will, in fact, increase the potential for habitat for native species with the planting of native coast live oak, California Sycamore and California buckeye. This impact is considered beneficial and no further discussion is offered nor are mitigation measures required.

Mitigation Measure: None Required.

Impact 3.4-4: Loss of or impact to wetlands.

The Estates Reservoir site has no jurisdictional wetlands as defined by Section 401 and 404 of the Clean Water Act, and Sections 1600-1616 of the California Fish and Game Code. No construction activities for the Estates Reservoir Replacement Project would occur at or near (within 100 feet) of streams, wetlands, or riparian habitat. Therefore, there would be no impacts from Project construction on features

potentially subject to Section 401 and 404 of the Clean Water Act and Sections 1600–1616 of the California Fish and Game Code.

Mitigation Measure: None Required.

References

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3.5 Cultural Resources

3.5.1 Approach to Analysis

The assessment of project impacts on historical resources under CEQA (CEQA Guidelines, Section 15064.5) is a two-step process: (1) determine whether the project site contains a historical resource as defined in CEQA.[9] If the site is found to contain a historical resource, then (2) determine whether the project would cause a substantial adverse change to the resource. The setting section below describes the existing properties in the vicinity of Estates Reservoir and assesses whether the properties are historical resources for the purposes of CEQA. The impact discussion that follows reviews the criteria for significant impacts on historical resources. The historical resources analysis included a literature review and field reconnaissance by qualified cultural resource personnel.

3.5.2 Setting/Regulatory Framework

This section includes information on the prehistoric and historic development within the Project area and identifies existing recorded historic resources. An analysis was performed to determine whether properties in the Project area can be considered historical resources for the purposes of CEQA.[10] National, state, and local historic preservation listings and surveys are summarized in this section. For additional information, please refer to the Cultural Resources Assessment Technical Report.

Prehistoric Setting

Cultural chronologies developed for Central California have gone through several permutations (See for example Beardsley, 1948, 1954; Bennyhoff and Hughes, 1987; Fredrickson, 1973, 1974; Heizer and Fenenga, 1939; Lillard and Purves, 1936; Lillard et al., 1939; Milliken and Bennyhoff, 1993; Ragir, 1972; Schenck and Dawson, 1929). Most recently, Milliken et al. (2007:99-123) developed what they term a "hybrid system" for the San Francisco Bay Area, combining an Early-Middle-Late Period temporal sequence with a pattern-aspect-phase cultural sequence.

[9] "Historical resources" includes, but is not limited to, any object, building, structure, site, area, place, record, or manuscript that is historically or archaeologically significant, or is significant in the architectural, engineering, scientific, economic, agricultural, educational, social, political, military, or cultural annals of California (CEQA Guidelines 15064.5). For the purposes of this section, the term "historical resources" is synonymous with "cultural resources."
[10] See CEQA Guidelines Section 21084.1.

Milliken et al.'s (2007) San Francisco Bay Area Cultural Sequence includes:

- Early Holocene (Lower Archaic) from 8000 to 3500 B.C.
- Early Period (Middle Archaic) from 3500 to 500 B.C.
- Lower Middle Period (Initial Upper Archaic) from 500 B.C. to A.D. 430.
- Upper Middle Period (Late Upper Archaic) from A.D. 430 to 1050.
- Initial Late Period (Lower Emergent) from A.D. 1050 to 1550.
- Terminal Late Period, post-A.D. 1550.

No archaeological evidence dating to pre-8000 B.C. has been located in the Bay Area. Milliken et al. (2007:99-123) posit that this dearth of archaeological material may be related to subsequent environmental changes that submerged sites, buried sites beneath alluvial deposits, or destroyed sites through stream erosion. A brief summary of the approach presented by Milliken et al. follows.

A "generalized mobile forager" pattern marked by the use of milling slabs and handstones and the manufacture of large, wide-stemmed and leaf-shaped projectile points emerged around the periphery of the Bay Area during the Early Holocene Period (8000 to 3500 B.C.). Beginning around 3500 B.C., evidence of sedentism, interpreted to signify a regional symbolic integration of peoples, and increased regional trade emerged. This Early Period lasted until circa 500 B.C. (Milliken et al., 2007:114, 115).

Milliken et al. identify "a major disruption in symbolic integration systems" circa 500 B.C., marking the beginning of the Lower Middle Period (500 B.C. to A.D. 430). Bead Horizon M1, dating from 200 B.C. to A.D. 430, is described by Milliken et al. as marking a 'cultural climax' within the San Francisco Bay Area (Milliken et al., 2007:115).

The Upper Middle Period (A.D. 430 to 1050) is marked by the collapse of the Olivella saucer bead trade in central California, abandonment of many Bead Horizon M1 sites, an increase in the occurrence of sea otter bones in those sites that were not abandoned, and the spread of the extended burial mortuary pattern characteristic of the Meganos complex into the interior East Bay. Bead Horizons M2 (A.D. 430 to 600), M3 (A.D. 600 to 800), and M4 (A.D. 800 to 1050) were identified within this period (Milliken et al., 2007:116).

The Initial Late Period, dating from A.D. 1050 to 1550, is characterized by increased manufacture of status objects. In lowland central California during this period, Fredrickson (1973 and 1994) noted evidence for increased sedentism, the development of ceremonial integration, and status ascription. The beginning of the Late Period, (circa A.D. 1000) is marked by the Middle/Late Transition bead horizon. The Terminal Late Period began circa A.D. 1550 and continued until European settlement of the area.

Ethnographic Setting

This section provides a brief summary of the ethnography of the Project vicinity and is intended to provide a general background only. More extensive reviews of Ohlone ethnography are presented in Bocek (1986), Cambra et al. (1996), Kroeber (1970), Levy (1978), Milliken (1995), and Shoup et al. (1995).

The Project area lies within the region occupied by the Ohlone or Costanoan group of Native Americans at the time of historic contact with Europeans (Kroeber, 1970:462-473). Although the term Costanoan is derived from the Spanish word Costaños, or "coast people," its application as a means of identifying this population is based in linguistics. The Costanoans spoke a language now considered one of the major subdivisions of the Miwok-Costanoan, which belonged to the Utian family within the Penutian language stock (Shipley, 1978:82-84). Modern descendants of the Costanoan prefer to be known as Ohlone. The name Ohlone is derived from the Oljon group, which occupied the San Gregorio watershed in San Mateo County (Bocek, 1986:8). The two terms (Costanoan and Ohlone) are used interchangeably in much of the ethnographic literature.

Each language group was subdivided into smaller village complexes or tribal groups. These tribal groups were independent political entities, each occupying specific territories defined by physiographic features. Each group controlled access to the natural resources of its territory, which also included one or more permanent villages and numerous smaller campsites used as needed during a seasonal round of resource exploitation. Chochenyo or East Bay Costanoan was the language spoken by the estimated 2,000 people who occupied the "east shore of San Francisco Bay between Richmond and Mission San Jose, and probably also in the Livermore Valley" (Levy, 1978:485).

Extended families lived in domed structures thatched with tule, grass, wild alfalfa, or ferns (Levy, 1978:492). Semisubterranean sweathouses were built into pits excavated in stream banks and covered with a structure against the bank. The tule raft, propelled by double-bladed paddles, was used to navigate across San Francisco Bay (Kroeber, 1970:468).

Mussels were an important staple in the Ohlone diet, as were acorns of the coast live oak, valley oak, tanbark oak, and California black oak. Seeds and berries, roots and grasses, and the meat of deer, elk, grizzly, rabbit, and squirrel formed the Ohlone diet. Careful management of the land through controlled burning served to ensure a plentiful, reliable source of all these foods (Levy, 1978:491).

The Ohlone usually cremated a corpse immediately upon death but, if there were no relatives to gather wood for the funeral pyre, interment occurred. Mortuary goods comprised most of the personal belongings of the deceased (Levy, 1978:490).

The arrival of the Spanish in 1775 led to a rapid and major reduction in native California populations. Diseases, declining birth rates, and the effects of the mission system served to largely eradicate the aboriginal life ways. Brought into the missions, the surviving Ohlone, along with the Esselen, Yokuts, and Miwok, were transformed from hunters and gatherers into agricultural laborers (Levy, 1978; Shoup et al., 1995). Following secularization of the mission system in the 1830s, numerous ranchos were established in the 1840s. Generally, the few Indians who remained were then forced, by necessity, to work on the ranchos.

In the 1990s, some Ohlone groups (e.g., the Muwekma, Amah, and Esselen further south) submitted petitions for federal recognition (Esselen Nation, 2007; Muwekma Ohlone Tribe, 2007). Many Ohlone are active in preserving and reviving elements of their traditional culture and are active participants in the monitoring and excavation of archaeological sites.

Historic Setting

The availability of water was central to the growth of Bay Area industry and clean drinking water was a priority for the communities that were established throughout the region. In 1866, Oakland residents began the first concerted attempt to develop a community water supply. Previously, wells and rainwater collected in cisterns had supplied the water for the community, although there had been talk of implementing a municipal system as early as 1854. Increased population and concerns regarding the salubrity of available water, spurred the push for a reliable water supply. The Contra Costa Water Company (CCWC), organized in 1866 by Anthony Chabot, Remi Chabot and Henry Pierce, was the first company to successfully provide an adequate water supply to Oakland. Over the next few years, construction began on a series of dams and reservoirs surrounding Oakland, and pipes were laid through the streets of Oakland. In 1872, the council began developing a plan for municipal ownership of the water supply, however the plan failed and ownership remained firmly in the hands of private companies (Hinkel and McCann, 1939:623-631).

The CCWC was the largest supplier of water in the Oakland area in the final years of the 19th century (Noble, 1999:3). When William J. Dingee, a real estate developer who owned acreage in the Montclair-Piedmont area, approached the CCWC about developing his property, however, they were unable to meet his needs (Noble, 1999:8-9). Dingee then took it upon himself to drill for water, and quickly became the CCWC's biggest competitor. Dingee piped his water from Moraga Peak to a reservoir in Piedmont and soon incorporated his operation as the Oakland Water Company (Noble, 1999:9). The competition between the CCWC and the Oakland Water Company became heated and soon newspapers reported that both companies were working to disrupt the others' supply. A rate war ensued. At the turn-of the-century, after a protracted battle, the two companies merged (Noble, 1999:10-11). The new company was known as the CCWC, but had William J. Dingee at the helm. The Estates Reservoir, initially known as Piedmont No. 1 Reservoir, was constructed in 1903 soon after the merger. To create the reservoir, a basin at the head of a small ravine was excavated into the existing bedrock and an earth fill dam was constructed at the west side (EBMUD, 2007a:3).

The new CCWC, headed by Dingee, lasted only until 1906, when the Peoples Water Company was created (Noble, 1999:11). The Peoples Water Company took in CCWC, the Richmond Water Company, and some smaller concerns. The Peoples Water Company immediately faced a challenge as the demand for water increased substantially in the early years of the 20th century. In November 1916, after struggling for ten years, the East Bay Water Company was incorporated "to bail out the sinking corporate ship of Peoples Water" (Noble, 1999:16). Like the private companies before it, East Bay Water Company inherited an uphill battle. Not only was demand from household consumers increasing, but World War I significantly increased the need for water in industrial applications (Noble, 1999:17).

By 1919, the Piedmont No. 1 Reservoir (Estates Reservoir), along with nine others throughout the East Bay, was being operated by the East Bay Water Company as either a filtration or a sterilization plant (Oakland Tribune, 1919:9). While the East Bay Water Company did its best to satisfy its customers, public opinion had shifted in favor of public ownership of utilities. In 1921, the legislature began the process of shifting from private to public control of water management and distribution and approved a bill that provided for the creation of a municipal utility district. That district, EBMUD, was approved by voters on May 8, 1923 (Noble, 1999:21).

Improvements to the Oakland water supply system were undertaken in 1934 to support the growing demand for water. New, greater capacity lines replaced old, worn out mains, and storage works, pumping units and other structures were repaired (Hinkel and McCann, 1939:658). In 1937, an increase in residential building, particularly within the Oakland Hills area, and concomitant population increase, prompted the construction of additional storage tanks, and enlargement of pumping plants to distribute the water to higher elevations (Hinkel and McCann, 1939:671).

The Piedmont No. 1 Reservoir basin was enlarged and renovated between 1938 and 1939 (EBMUD, 2008a). On March 30, 1939, the Oakland Tribune reported that:

> Reconstruction of Piedmont No. 1 Reservoir [Estates Reservoir] has been under way for several months and will be completed about May 1. The dam is being raised seven feet, a new parapet wall is being built, and the entire reservoir has been given a lining of concrete. With Dingee Reservoir, which is on the same level, it serves 18,000 customers.

A new 20-inch pipeline was also expected to be laid in the near future to replace an old pipe between Moraga Road and Estates Reservoir (Oakland Tribune, 1939:14B). According to EBMUD (2008b), the dam crest was raised approximately 9 feet, increasing the elevation from 765 feet above mean sea level to 774 feet above mean sea level. An engineering drawing for this reconstruction work shows that, in addition to the work reported in the Oakland Tribune, an oil macadam pathway along with a rubble masonry wall was constructed leading down to a structure described as the Montclair Booster Plant. A rubble masonry drain extended down the hill to a stilling basin near the

base of the hill. A culvert was also constructed at this time (EBMUD, 1938). Distributing reservoirs, or balancing reservoirs, constructed by the East Bay Water Company were typically lined with concrete and enclosed by wooden covers (Hinkel and McCann, 1939:642).

The Montclair Pumping Plant (referred to as the Montclair Booster Plant on the 1938 plan) was constructed downhill from the reservoir circa 1936 (EBMUD, 1936, 2008a). Seismic modification of the plant was conducted between 1997 and 1998, and included building alterations and replacement of the motor controls and instrumentation (EBMUD, 2008a). Situated downhill from the pumping plant, a valve and meter pit for the 20-inch outlet pipe leading to a 20-inch distribution main in Wood Drive was likely constructed around the same time as the Montclair Pumping Plant (EBMUD, 2007b:6, 2008b).

In the 1950s, EBMUD began to construct covered reservoirs for their treated water.[11] However, most of their existing facilities were open-cut reservoirs of various sizes located in growing residential districts. EBMUD began to implement the retrofitting of its existing open-cut storage facilities in the early 1960s (EBMUD, 2008, pers. comm.). This was in response to a growing trend for covered reservoirs to protect the drinking supply and provide for more regulated storage of treated water. These facility improvements also corresponded to a new design-minded era at EBMUD. Recognizing that much of its infrastructure was now part of urban and suburban residential areas, EBMUD adopted a "good neighbor" approach towards its facility design and its dealings with surrounding communities (Nobel, 1999:130). Initial collaborations with designers and design professionals (including Robert Royston) proved so successful with neighboring communities, that EBMUD adopted a more creative approach to the design and retrofit of its reservoirs and facilities.

At Estates Reservoir, Robert Royston and his firm, Royston, Hanamoto, Mayes & Beck, were hired by EBMUD to make the utilitarian roof coverings visually appealing to the upslope residents who would look down upon the construction from above. He used a series of shallow terraces in his reservoir roof designs that created subtle shadows on the relatively flat form of the roof. The terraces were each flowing along their inside edges, had asymmetrical forms and graduated degrees of texture refinement. At Estates, the terraces went down towards a central low plain. Juxtaposed to this were three large, although varying, square platforms that were raised above the terraced field. Two platforms housed large water fountains. A third contained a planter with trees. The fountains and planter were constructed as self-supporting elements within the larger engineered roof platform. The roof itself was built with Glu-lam beams set between concrete columns. The fountains and planter were set on concrete columns within the beam matrix. Construction of the roof was completed in 1968. Beyond periodic repairs to the roof and fountain mechanisms, and alterations in the plants within the planter bed,

[11] The following portion of the Historic Setting was prepared by Garavaglia Architecture, Inc. (refer to Appendix A of the Cultural Resources Assessment Technical Report for Garavaglia Architecture, Inc.'s full Historic Resources Evaluation report).

few alterations have been made to the reservoir roof since its construction. A re-roofing project was also completed in 2000. The fountains, while still functional, have been turned off as of 2008, as part of EBMUD's ongoing water conservation program. As part of a revised long-term system-wide water management strategy and the threat of drought, there are no plans to restore water service to the fountains in the foreseeable future.

Robert Norman Royston, commonly cited as one of the nation's most distinguished Landscape Architects, helped establish and define California Modernism in the post World War II period. In 1958, Royston joined with Asa Hanamoto and David R. Mayes to form Royston, Hanamoto & Mayes. After a series of personnel changes, the company became RHAA. Though Royston retired from active practice in 1998, the name remains the same today (Maclay, 2008).

Though his early work was primarily residential, Royston may be best known for his more public commissions, including the Standard Oil Rod & Gun Club in Point Richmond, California, public plazas such as St. Mary's and Portsmouth Squares in San Francisco, and suburban parks of varying scale like Bowden, Rinconada and Mitchell Parks in Palo Alto and Central Park in Santa Clara. It is these parks, designed primarily between 1945 and 1965 that helped to forge new directions in American park design. According to a recent study of Royston's suburban park design, his work was informed by a design theory comprised of a set of principles that formed early and were refined throughout the course of his career. In both his teaching and professional design work, Royston sought what he called the "timeless principles of design," and identified these not as strict design guidelines, but rather as a point of departure (Rainey and Miller, 2006:55). Royston believed that landscape architecture should engage all the senses, especially sight, and many of his parks were designed to offer diverse spatial experiences and sequential views. Royston also valued an interdisciplinary approach to design and welcomed citizen participation in the design process (Rainey and Miller, 2006:55-71).

In 2000, Royston was named a distinguished alumnus of University of California Berkeley's College of Environmental Design. Over the years, the various iterations of Royston's firm have earned more than 70 design awards including American Institute of Architects awards for the T. Jack Foster home in Orinda, California (1953) and Hillsdale High School in San Mateo (1956). His firm has also received American Society of Landscape Architects merit awards for Quarry Theater at University of California Santa Cruz and Sunriver, a 5,500-acre planned community in Oregon. In 1975, he received the Award of Honor in Landscape Architecture from the City of San Francisco Art Commission and in 1978, the American Institute of Architects Medal. In 1973, he received the American Society of Landscape Architects Medal, the highest award granted by the professional organization. Royston also received a Northern California Chapter of American Society of Landscape Architects Award for Outstanding Contributions to the Stature of the Profession. Royston passed away at his Mill Valley home on September 19, 2008. He was 90 years old (Maclay, 2008).

Methods

The effort to identify historical resources in the Project area included a records search and review of existing documents and reference materials, Native American consultation, and a field survey.

Staff at the California Historical Resources Information System, Northwest Information Center at Sonoma State University conducted a records search of the Project vicinity on August 12, 2008 (File No. 08-0079). The records search involved a review of records and maps on file at the Northwest Information Center, and information on previous archaeological studies and recorded sites within a quarter-mile radius of the Project area was provided. Relevant pages from the Office of Historic Preservation Historic Properties Directory were reviewed as well as listings on the California Inventory of Historical Resources in the vicinity of the Project area. The appropriate sections of the 1878 Thompson & West Historical Atlas Map of Alameda County, the 1897 (reprinted 1907) and 1915 (reprinted 1939) USGS Concord Quadrangles, and the 1943 U.S. Army Corps of Engineers Tactical Map, Concord Quadrangle, Grid Zone "G" were also reviewed. The 1859 and 1871 Rancho San Antioch (V. & D. Peralta) Plat Maps, and the 1883 GLO Plat Map for Township 1 South, Range 3 West were also examined.

On July 21, 2008, the Native American Heritage Commission was contacted (by letter) to request information on known Native American sacred lands within the Project area and to request a listing of individuals or groups with a cultural affiliation to the Project area. There was no response from the Native American Heritage Commission, therefore the letter was resent on October 7, 2008. The Native American Heritage Commission responded by letter on October 27, 2008. The letter stated that a search of the sacred land file had failed to indicate the presence of Native American cultural resources in the immediate Project area. A list of Native American contacts was included in the response. On October 28, 2008, WSA sent letters to the following seven contacts identified by the Native American Heritage Commission, requesting comment on this Project: Jakki Kehl; Rosemary Cambra, Chairperson, Muwekma Ohlone Indian Tribe of the San Francisco Bay Area; Andrew Galvan, the Ohlone Indian Tribe; Katherine Erolinda Perez; Ramona Garibay, Representative, Trina Marine Ruano Family; Irene Zwierlein, Chairperson, Amah/Mutsun Tribal Band; and Ann Marie Sayers, Chairperson, Indian Canyon Mutsun Band of Costanoan. No responses were received by November 19, 2008. Follow-up phone calls were made on November 19, 2008 and December 2, 2008. Irene Zwierlein said that she had no comments, while Andrew Galvan said he had no comments but asked to be contacted if prehistoric artifacts were encountered. No other comments were received. Ms. Cambra was not contacted as her phone was disconnected and no other telephone numbers were available for her.

A field survey was undertaken by WSA archaeologist, Aimee Arrigoni, and a site visit was conducted by Garavaglia Architecture, on August 28, 2008. The Project area has been heavily disturbed through construction of the reservoir, earthen dam and associated infrastructure. Landscaping has been undertaken, primarily around the perimeter of the

parcel. Ms. Arrigoni recorded the historic structures on the parcel (referred to as the 'Estates Reservoir site' and consisting of the concrete-lined basin, earthen dam, the Montclair Pumping Plant, the valve and meter pit, the stilling basin and culvert, the rubble retaining wall, and the pathways). Garavaglia Architecture, Inc., recorded the roof structure designed by Robert Royston.

Results

The records search revealed that two cultural resource studies have been undertaken that include the Project area (Chavez, 1985; Mayfield, 1978). However, both studies are regional overviews and did not include field reconnaissance. One additional study, that did involve an archaeological survey, has been conducted within one-quarter-mile of the Project area (Chavez and Hupman, 2000).

There are no previously recorded archaeological sites within the record search area. Three historic buildings have been recorded within one-quarter-mile of the Project area, although none are located within the Project area (Oakland Cultural Heritage, 1994a, 1994b, 1994c). An additional seven historic buildings located within one-quarter-mile of the Project area are listed in the Office of Historic Preservation Historic Properties Directory, but none are within the Project area (Office of Historic Preservation # 106064, 106105. 106106, 106267, 092992, 106298, 106397).

In 1986, the Estates Reservoir roof structure designed by Robert Royston was rated "*C3 Potential Designated Historic Property, Post 1945," in the Oakland Cultural Heritage Reconnaissance Survey. The asterisk indicates that the property was less than 45 years old at the time of rating with a contingency rating of "C". The "C" indicates that the property is of "Secondary Importance," as a superior or visually important example, and the "3" indicates that the property is not within a historic district.

Circa 2007, the Estates Reservoir fountains, planter and surface planes were nominated for designation as a City of Oakland historic landmark (Parish 2007). The Cultural Landscape Foundation supported this designation, and stated that, in early 2008, they had "recognized the Estates Drive Reservoir as a nationally significant historic designed landscape in the Foundation's Landslide feature." The Cultural Landscape Foundation stated that they thought that Royston's design may be eligible for the National Register of Historic Places (Birnbaum 2008).

On January 14, 2008, the Estates Reservoir fountains, planters and covers were preliminarily determined by the Landmarks Preservation Advisory Board, City of Oakland, to be eligible for City of Oakland historic landmark designation, and the property was given a preliminary evaluation rating of "B," denoting "Major Importance" (Pavlinec 2008). Later in 2008, the Estates Reservoir roof structure was included in the Cultural Landscape Foundation's Landslide list, which is "a yearly designation of significant landscapes at risk of being lost" (The Cultural Landscape Foundation 2008). However, the Cultural Landscape Foundation's website states that the reservoir design is

"not considered one of the most important examples of Royston's work" (The Cultural Landscape Foundation 2007).

No prehistoric cultural material was observed during the field survey. Considering the extent of disturbance to the site, and the steepness of the hill upon which the Project area is situated, there is very low potential for intact prehistoric deposits. The Project area has been heavily disturbed through construction of the reservoir, earthen dam and associated infrastructure. Landscaping has been undertaken, primarily around the perimeter of the parcel. The reservoir is currently in use, and the concrete-lined basin contained water at the time of survey.

The Estates Reservoir site, consisting of the concrete-lined basin, earthen dam, the Montclair Pumping Plant, the valve and meter pit, the stilling basin and culvert, the rubble retaining wall, and the pathways, is recommended as not eligible for listing in the California Register of Historical Resources (CRHR), and is not considered a cultural resource for CEQA purposes. The Estates Reservoir, constructed in 1903, is related to the continued development of an adequate water supply for the Oakland area. As the development of a safe and reliable water supply was essential to the growth and prosperity of the City of Oakland and its neighborhood communities, the Estates Reservoir is associated with events that have made a significant contribution to the broad patterns of Oakland's history (Criterion 1). The Estates Reservoir site is also associated with William J. Dingee, a person important to the San Francisco Bay Area's history (Criterion 2). However, subsequent modifications have affected the integrity of the 1903 design, and the current state of the property is not reflective of this period. The modifications to the reservoir, including the installation of a concrete lining and of the roof structure, the raising of the earthen dam, construction of pathways and retaining walls, and construction of the Montclair Pumping Plant, have been undertaken as part of normal maintenance and necessary upgrades to the system, and occurred in conjunction with maintenance and upgrades at other reservoir and pumping plant sites in the Oakland area. These modifications and upgrades have affected the integrity of the Estates Reservoir site as it relates to this early period, and the site now lacks integrity of design, materials, workmanship and feeling.

The reservoir was originally constructed as an open-cut reservoir, although the cut itself is no longer visible, and lined with concrete in 1938-1939. Distribution reservoirs constructed by the East Bay Water Company, which had control of the reservoir in the early 1900s, were typically lined with concrete, and while EBMUD had been created by this time, the 1930s modifications may be reflective of this type of construction. The components of the site appear to have been constructed in a style and using construction techniques consistent with that used at other reservoir and pumping plant sites in the San Francisco East Bay region. However, subsequent modifications and upgrades, primarily the installation of the roof structure, have affected the integrity of the 1930s design of the reservoir. The site does not represent the work of an important creative individual, or possess high artistic values (Criterion 3). The site is unlikely to yield information important in history (Criterion 4).

Garavaglia Architecture, Inc., evaluated the Estates Reservoir roof. The Estates Reservoir roof, designed by Robert Royston, is recommended eligible for listing in the CRHR at the local level under Criteria 1 and 3, and is considered a cultural resource for CEQA purposes. The Estates Reservoir roof structure is very clearly a part of the pervasive mid-century movement toward streamlined, modern minimalist designs. California was the center of development for post-war modern design trends. Royston and his contemporary landscape architects and architects formed their bases largely in the Bay Area. A high concentration of their work can be found throughout the local environment even though their influence was worldwide. Estates Reservoir is one of a handful of Royston's designs in the East Bay. Within Oakland, it is one of the only public modern landscapes. As such, it is one of the only connections that Oakland has to Robert Royston and the popular design trends in public spaces during the post- World War II period. The Estates Reservoir is a prime example of how projects as mundane as public utility reservoirs were transformed into art by the locally available design talent (Criterion 1).

Royston was largely influenced by the topography and environment of the Bay Area, having grown up in rural Santa Clara County. The climate and how it offered opportunities for year-round interaction with nature became fundamental parts of his design language. Over time, as his popularity and reputation became more widespread, he exported these cherished California lifestyle facets to the rest of the world. He helped to solidify the modern California lifestyle in the popular psyche. This "California" style came to be an interpretation of popular European modernist design philosophies (form follows function, etc.) to fit a more relaxed, environmentally aware, design conscious society. Sleek lines, simplified forms, emphasis on horizontal planes and the interplay of opposing elements (rough versus smooth, horizontal versus vertical, manufactured versus natural, etc.) were all design techniques that Royston and his contemporaries used to create their commissions. Estates Reservoir, although small in comparison to Royston's other public projects, employs many of these signature, mid-century modern design elements (Criterion 3).

The Estates Reservoir roof maintains high to very high integrity of location, setting, materials, workmanship, feeling and association, and moderate integrity of design.

Due to the high level of public interest in the Estates Reservoir roof, Garavaglia Architecture, Inc., prepared evaluations of the roof's eligibility for inclusion in the National Register of Historic Places and the Local Register of Historic Places.

The Estates Reservoir roof is recommended as not eligible for listing in the National Register of Historic Places. The Estates Reservoir roof uses several design strategies and philosophies – emphasis on horizontal planes juxtaposed with strong vertical focal points, use of a variety of natural and manmade textures – that helped to define mid-century modern landscape design. However, none are used here in an unexpected or innovative manner and while the design is emblematic of national trends in popular

tastes, it does not appear to have influenced further adaptations or development of the movement (Criterion A).

Robert Royston was a highly influential and well-respected 20th century landscape architect and artist. Unlike most architects, and certainly most landscape architects, his works were recognized as culturally and historically significant within his own lifetime. A large body of his work survives today, including both private and public commissions. When considered within his larger body of work, many examples remain that showcase his signature style of flowing forms and strong contrasting visual elements on multiple planes. Estates Reservoir is one example but it is not the best representation of Royston style within the body of his remaining work (Criterion B).

Royston designs are accessible. They are meant for people to be in and interact within the spaces that are created. This is most evident in his public commissions. Estates Reservoir is one of Royston's smallest and least publicly accessible public commissions. Its size and restricted access greatly limit how the public is allowed to interact with the landscape. It is a single space as opposed to the series of spaces in his larger designs. It is a visual subject rather than a physical object. It utilizes several of Royston's signature elements, but on a smaller and more subdued scale than his other public commissions. Estates Reservoir is an example of a refined, well-developed design vocabulary. It is not, however, the only remaining example of Royston's polished design capabilities, nor is it the best and most representative work in Royston's long career (Criterion C).

The Estates Reservoir Roof has previously been determined as potentially eligible as a City of Oakland Landmark with an evaluation rating of B. Because Garavaglia Architecture, Inc., recommends Estates Reservoir roof to be eligible for listing on the CRHR, it would automatically be considered eligible for listing as a City of Oakland Heritage Property. Therefore, Garavaglia Architecture, Inc., concurs with the previous local eligibility determination.

Regulatory Framework

California Environmental Quality Act

CEQA requires that public or private projects financed or approved by public agencies must assess the effects of the project on historical resources. CEQA also applies to effects on archaeological sites, which may be included among "historical resources" as defined by Guidelines Section 15064.5, subdivision (a), or may be subject to the provisions of Public Resources Code Section 21083.2, which governs review of "unique archaeological resources." Historical resources may generally include buildings, sites, structures, objects, or districts, each of which may have historical, architectural, archaeological, cultural, or scientific significance.

Under CEQA, "historical resources" include the following:

1. A resource listed in, or determined to be eligible by the State Historical Resources Commission, for listing in the CRHR (Public Resources Code, Section 5024.1, Title 14 CCR, Section 4850 et seq.).

2. A resource included in a local register of historical resources, as defined in Section 5020.1(k) of the Public Resources Code or identified as significant in an historical resource survey meeting the requirements of Section 5024.1(g) of the Public Resources Code, shall be presumed to be historically or culturally significant. Public agencies must treat any such resource as significant unless the preponderance of evidence demonstrates that it is not historically or culturally significant.

3. Any object, building, structure, site, area, place, record, or manuscript which a lead agency determines to be historically significant or significant in the architectural, engineering, scientific, economic, agricultural, educational, social, political, military, or cultural annals of California may be considered to be an historical resource, provided the lead agency's determination is supported by substantial evidence in light of the whole record. Generally, a resource shall be considered by the lead agency to be "historically significant" if the resource meets the criteria for listing on the CRHR (Public Resources Code, Section 5024.1, Title 14 CCR, Section 4852), including the following:

    a) Is associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage,[12]
    b) Is associated with the lives of persons important in our past,[13]
    c) Embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of an important creative individual, or possesses high artistic values,[14] or
    d) Has yielded, or may be likely to yield, information important in prehistory or history.[15]

The criteria for listing historical resources in the California Register are consistent with those developed by the National Park Service for listing historical resources in the National Register, but have been modified for state use in order to include a range of historical resources, which better reflect the history of California (Public Resources Code, Section 5024.1, Title 14 CCR, Section 4852).

1. The fact that a resource is not listed in, or determined to be eligible for listing in the CRHR, not included in a local register of historical resources (pursuant to Section

[12] Criterion 1
[13] Criterion 2
[14] Criterion 3
[15] Criterion 4

5020.1(k) of the Public Resources Code), or identified in an historical resources survey (meeting the criteria in Section 5024.1(g) of the Public Resources Code) does not preclude a lead agency from determining that the resource may be an historical resource as defined in Public Resources Code sections 5020.1(j) or 5024.1.

The Public Resources Code, Section 5024.1, Title 14 CCR, Section 4852 provides special considerations for determining eligibility for listing in the California Register, including:

1. Historical resources achieving significance within the past fifty (50) years. In order to understand the historic importance of a resource, sufficient time must have passed to obtain a scholarly perspective on the events or individuals associated with the resource. A resource less than fifty (50) years old may be considered for listing in the California Register if it can be demonstrated that sufficient time has passed to understand its historical importance.

In order to meet one or more of the criteria listed above, a cultural resource must possess integrity to qualify for listing in the CRHR. Integrity is generally evaluated with reference to qualities including location, design, materials, workmanship, setting, feeling, and association. A potentially eligible site must retain the integrity of the values that would make it significant. Typically, integrity is indicated by evidence of the preservation of the contextual association of artifacts, ecofacts, and features within the archaeological matrix (Criterion 4) or the retention of the features that maintain contextual association with historical developments or personages that render them significant (Criteria 1, 2, or 3). Evidence of the preservation of this context is typically determined by stratigraphic analysis and analysis of diagnostic artifacts and other temporal data (e.g., obsidian hydration, radiocarbon assay) to ascertain depositional integrity or by the level of preservation of historic and architectural features that associate a property with significant events, personages, or styles.

Integrity refers both to the authenticity of a property's historic identity, as shown by the survival of physical characteristics that existed during its historic period and to the ability of the property to convey its significance. This is often not an all-or-nothing scenario (determinations can be subjective); however, the final judgment must be based on the relationship between a property's features and its significance.

Section 15064.5 of the CEQA Guidelines indicates a project may have a significant environmental effect if it causes "substantial adverse change" in the significance of an "historical resource" or a "unique archaeological resource" as defined or referenced in CEQA Guidelines Section 15064.5[b, c] (revised October 26, 1998). Such changes include "physical demolition, destruction, relocation, or alteration of the resource or its immediate surroundings such that the significance of an historical resource would be materially impaired" (CEQA Guidelines 1998 Section 15064.5 [b]).

Archaeological resources that do not meet the criteria for "historical resources" defined above, may meet the definition of "unique archaeological resources" as defined in

Section 21083.2 of the Public Resources Code. If an archaeological resource is neither a unique archaeological nor a historical resource, the effects of the project on those resources will not be considered a significant effect on the environment. It is sufficient that the resource and the effects on it be noted in the EIR, but the resource need not be considered further in the CEQA process. CEQA requires that if a project results in an effect that may cause a substantial adverse change in the significance of an historical resource, or would cause significant effects on a unique archaeological resource, then alternative plans or mitigation measures must be considered. Therefore, prior to assessing effects or developing mitigation measures, the significance of historical resources must first be determined. The steps that are normally taken in a historical resources investigation for CEQA compliance are as follows:

1. Identify potential historical resources.
2. Evaluate the eligibility of historical resources.
3. Evaluate the effects of the project on eligible historical resources.

Historic Preservation Element of the Oakland General Plan (1994)

In 1994, the City of Oakland adopted the Historic Preservation Element as a component of its General Plan (formerly the Oakland Comprehensive Plan). The General Plan is the City's primary policy document for land use and related subjects and the basis for all of the City's regulations and programs concerning the physical environment. Within the context of the General Plan, the Historic Preservation Element sets forth goals, objectives, policies, and actions that encourage preservation and enhancement of Oakland's older buildings, districts, and other physical environmental features that have special historic, cultural, educational, architectural, or aesthetic interest or value. The element is based on two broad goals:

Goal 1: To use historic preservation to foster economic vitality and quality of life in Oakland by:

- Stressing the positive community attributes expressed by well-maintained older properties;
- Maintaining and enhancing throughout the City the historic character, distinct charm, and special sense of place provided by older properties;
- Establishing and retaining positive continuity with the past thereby promoting pride, a sense of stability and progress, and positive feelings for the future;
- Stabilizing neighborhoods, enhancing property values, conserving housing stock, increasing public and private economic and financial benefits, and promoting tourist trade and interest through preservation and quality maintenance of significant older properties;
- Preserving and encouraging a city of varied architectural styles and environmental character reflecting the distinct phases of Oakland's cultural, social, ethnic, economic, political, and architectural history; and

- Enriching the quality of human life in its educational, spiritual, social, and cultural dimensions through continued exposure to tangible reminders of the past.

Goal 2: To preserve, protect, enhance, perpetuate, use and prevent the unnecessary destruction or impairment of properties or physical features of special character or special historic, cultural, educational, architectural or aesthetic interest or value. Such properties or physical features include buildings, building components, structures, objects, districts, sites, natural features related to human presence, and activities taking place on or within such properties or physical features.

These goals are inclusive and ambitious and seek to maximize the city's exposure to historic preservation benefits. Within these goals are five objectives and related policies:

Objective 1: To adopt an objective, consistent, well-documented and widely accepted method for identifying which properties warrant, or may warrant, preservation effort and for determining the relative importance of each of these properties so that preservation efforts may be appropriately gauged.

Policy 1.3: The City will designate significant older properties which definitively warrant preservation as Landmarks, Preservation Districts or Heritage Properties. The designations will be based on a combination of Historical and Architectural Inventor Ratings, National Register of Historical Places criteria, and special criteria for Landmarks and Preservation District eligibility. Landmarks, properties which contribute or potentially contribute to a Preservation District, and Heritage Properties will be called "Designated Historic Properties."

Objective 2: To develop a system of preservation incentives and regulations for specially designated significant older properties which (i) enhances economic feasibility for preservation; (ii) provides a predictable and appropriate level of protection, based on each property's importance; (iii) reasonably balances preservation with other concerns; and (iv) operates efficiently, avoiding unnecessary regulatory procedures and review periods.

Policy 2.2: Landmarks and Preservation will be classified according to importance, with three classes of Landmarks and two classes of Preservation Districts. Properties eligible for each of these classifications will be as follows:

- Class 1 Landmarks: Properties rated "A" under the Landmarks Preservation Advisory Board's "Guidelines for Determination of Landmark Eligibility" (the "Guidelines") and which are on or appear eligible for the National Register of Historic Places.
- Class 2 Landmarks: Properties rated "B" under the Guidelines and which are on or appear eligible for the National Register of Historic Places; and properties rated "A" under the Guidelines and which are not on and do not appear eligible for the National Register of Historic Places.

- Class 3 Landmarks: Properties rated "B" under the Guidelines and which are not on and do not appear eligible for the National Register of Historic Places.
- Class 1 Preservation Districts: All Areas of Primary Importance identified by the Intensive Survey plus other areas, which meet the "Guidelines for Determination of Preservation District Eligibility."
- Class 2 Preservation Districts: All Areas of Secondary Importance identified by the Intensive Survey plus other areas, which meet the "Guidelines for Determination for Preservation District Eligibility."

The methodology of the Intensive Survey will be used to determine whether properties appear eligible for the National Register of Historic Places.

Objective 3: To establish administrative procedures and criteria to promote preservation of significant older properties as a routine part of City-sponsored or assisted projects, programs, and regulatory activities.

Policy 3.1: Avoid or minimize adverse historic preservation impacts related to discretionary City actions. The City will make all reasonable efforts to avoid or minimize adverse effects on the Character-Defining Elements of existing or Potential Designated Historic Properties which could result from private or public projects requiring discretionary City actions.

Policy 3.6: To the extent consistent with other Oakland General Plan provisions, City-sponsored or assisted projects involving an existing or Potential Designated Historic Property, except small-scale projects, will:

- Be selected and designed to avoid or minimize adverse effects on these properties and to promote their preservation and enhancement;
- Incorporate preservation efforts based in part on the importance of each property; and
- Be considered to have no adverse effects on these properties if they conform with the Secretary of the Interior's Standards for the Treatment of Historic Properties.

The City will encourage applicants for City-assisted projects to submit proposals consistent with this policy.

Policy 3.8: For purposes of environmental review under the CEQA, the following properties will constitute the City of Oakland's Local Register of Historical Resources:

- All Designated Historic Properties, and
- Those Potential Designated Historic Properties that have an existing rating of "A" or "B" or are located within an Area of Primary Importance.

Until complete implementation of Action 2.1.2 (Redesignation), the Local Register of Historical Places will also include the following designated properties: Oakland Landmarks, S-7 Preservation Combining Zones properties, and Preservation Study List properties.

Objective 4: To develop databases identifying existing and potential archeological sites and adopt procedures for protecting significant archeological resources.

Policy 4.1: To protect significant archeological resources, the City will take special measures for discretionary projects involving ground disturbances located in archeologically sensitive areas.

Objective 5: To provide and encourage informational and educational programs to enhance public and City staff appreciation of older properties and increase the level of technical knowledge.

Oakland Planning Code

The Oakland Planning Code sets forth procedures regarding the preservation of sites and areas of special character or special historical, architectural, or aesthetic interest or value, such as officially designated city landmarks and buildings included within locally designated Historic Districts. The Planning Code created the Landmarks Preservation Advisory Board to advise the Planning Commission in regulation, recognition, inventory, evaluation, and consultation concerning historic properties. Subdivision (p) of the Planning Code defines the purpose of this planning section:

To prevent the unnecessary destruction or impairment of structures, other physical features, and areas of special character or special historical, cultural, educational, architectural, aesthetic, or environmental interest or value and to achieve the following purposes:

- The protection, enhancement, perpetuation, and use of structures, other physical features, sites, and areas that are reminders of past eras, events, and persons important in local, state or national history, or which provide significant examples of architectural styles of the past or are landmarks in the history of architecture, or which are unique and irreplaceable assets to the City and its neighborhoods, or which provide for this and future generations examples of the physical surroundings in which past generations lived.
- The development and maintenance of appropriate settings and environment for such structures, and other physical features, on such sites, and in such areas.
- The enhancement of property values, the stabilization of neighborhoods and areas of the City, the increase of economic and financial benefits to the City and its inhabitants, and the promotion of tourist trade and interest.
- The preservation and encouragement of a city of varied architectural styles, reflecting the distinct phases of its cultural, social, economic, political, and architectural history.
- The enrichment of human life in its educational and cultural dimensions in order to serve spiritual as well as material needs, by fostering knowledge of the living heritage of the past.

The Oakland Zoning Regulations generally apply to all properties within the city of Oakland. However, EBMUD is exempt from local agency zoning regulations for specified projects, pursuant to Section 53091 of the State Planning Code. The Estates Reservoir Replacement Project qualifies for the referenced exemption.

The Oakland Planning Code also defines designated landmarks:

In any zone, the City Council may designate as a landmark any facility, portion thereof, or group of facilities which has special character, interest, or value of any of the types referred to in subdivision (p) of Section 2002. The designating ordinance for each landmark shall include a description of the characteristics of the landmark which justify its designation and a clear description of the particular features that should be preserved.

Properties in the Project Area

The Estates Reservoir roof, designed by Robert Royston, was evaluated by Garavaglia Architecture, Inc., and is recommended eligible for listing in the CRHR at the local level under Criteria 1 and 3, and is considered a cultural resource for CEQA purposes.

The Estates Reservoir roof has previously been determined as potentially eligible as a City of Oakland Landmark with an evaluation rating of B. Garavaglia Architecture, Inc., concurs with the previous local eligibility determination.

3.5.3 Impacts and Mitigation Measures

Significance Criteria

In accordance with criteria presented in Appendix G of the CEQA Guidelines, the project would be considered to have a significant impact on cultural resources if it would result in any of the following:

- A substantial adverse change in the significance of a historical resource that is either listed or eligible for listing in the National Register of Historic Places, the CRHR, or a local register of historical resources;
- A substantial adverse change in the significance of a unique archaeological resource;
- Disturbance or destruction of a unique paleontological resource or site or a unique geologic feature; or
- Disturbance of any human remains, including those interred outside or formal cemeteries.

CEQA provides that a project may cause a significant environmental effect where the project could result in a substantial adverse change in the significance of a historical

resource (Public Resources Code, Section 21084.1). CEQA Guidelines Section 15064.5 defines a "substantial adverse change" in the significance of a historical resource to mean physical demolition, destruction, relocation, or alteration of the resource or its immediate surroundings such that the significance of a historical resource would be "materially impaired" (CEQA Guidelines, Section 15064.5(b)(1).

CEQA Guidelines Section 15064.5(b)(2) defines "materially impaired" for purposes of the definition of "substantial adverse change" as follows:

The significance of a historical resource is materially impaired when a project:

A) Demolishes or materially alters in an adverse manner those physical characteristics of an historical resource that convey its historical significance and that justify its inclusion in, or eligibility for, inclusion in the CRHR; or
B) Demolishes or materially alters in an adverse manner those physical characteristics that account for its inclusion in a local register of historical resources pursuant to Section 5020.1(k) of the Public Resources Code or its identification in an historical resources survey meeting the requirements of Section 5024.1(g) of the Public Resources Code, unless the public agency reviewing the effects of the project establishes by a preponderance of evidence that the resource is not historically or culturally significant; or
C) Demolishes or materially alters in an adverse manner those physical characteristics of a historical resource that convey its historical significance and that justify its eligibility for inclusion in the CRHR as determined by a lead agency for purposes of CEQA.

In accordance with CEQA Guidelines Section 15064.5(b)(3), a project that follows the Secretary of the Interior's Standards for the Treatment of Historic Properties with Guidelines for Preserving, Rehabilitating, Restoring, and Reconstructing Historic Buildings or Standards for Rehabilitation and Guidelines for Rehabilitating Historic Buildings is considered to have mitigated impacts to historical resources to a less than significant level.

Historical resources are usually 50 years old or older and must meet one or more of the criteria for listing in the CRHR, in addition to maintaining a sufficient level of physical integrity (CEQA Guidelines Section 15064.5[a][3]). Since the Estates Reservoir roof was constructed in 1968, as of 2009, it is approximately 41 years old.

According to the CEQA Guidelines, a project would create a significant impact on archaeological resources if it causes a substantial adverse change in the resource's significance or if it disturbs any human remains, including interments outside formal cemeteries. Significant impacts are those that diminish the integrity, research potential or other characteristics that make a resource significant or important. Significant impacts on archaeological sites listed or eligible for listing on the National Register of Historic Places or CRHR require mitigation.

As the Estates Reservoir roof is recommended eligible for listing in the CRHR, and is slated for demolition as part of the Estates Reservoir Replacement Project, the Project will have a significant impact on this cultural resource.

Impacts and Mitigation Measures

Impact 3.5-1: Substantial adverse change to the significance of the Estates Reservoir roof.

The Estates Reservoir roof structure is recommended as eligible for listing on the CRHR by Garavaglia Architecture, Inc., under Criteria 1 and 3. EBMUD proposes to demolish the roof structure as part of the Estates Reservoir Replacement Project. The proposed Project would, therefore, have a substantial adverse change in the significance of this resource, as defined in CEQA Guidelines, §15064.5(b). With implementation of Mitigation Measure 3.5-1, the Project's adverse effect on this resource would be reduced, but not to a level that would be less than significant. Implementation of Mitigation Measure 3.5-1 will reduce an aspect of the adverse effect (the loss of historical information), however, it will not prevent the physical loss of the resource, and there will remain a residual impact that is significant and unavoidable.

> **Measure 3.5-1**: A Historic American Building Survey/Historic American Engineering Record style documentation of the Estates Reservoir roof designed by Robert Royston will be prepared. The level of documentation will be similar to that described in Historic American Building Survey documentation level II, which includes at a minimum measured drawings such as as-builts or original design plans, historic photographs, if available, and current large-format photographs of significant architectural design features, and a written history and description. The documentation will be submitted to the Oakland Heritage Alliance, the Oakland Historical Archives and the UC Berkeley Historical Archives. The intent is to reduce the adverse effect associated with loss of historical information; it will not prevent the physical loss of the resource and a significant and unavoidable impact will occur.

Significance after Mitigation: Significant and Unavoidable.

Impact 3.5-2: Substantial adverse changes to the significance of currently unknown historical or prehistorical resources, including unique archaeological resources.

Although the likelihood of encountering intact archaeological deposits is considered extremely low, there is the possibility that archaeological material may be located during construction activities. Site preparation, grading, and construction activities could adversely impact previously undiscovered archeological resources. Implementation of the following mitigation measure would reduce potentially significant impacts to undiscovered archeological resources to a less than significant level.

Measure 3.5-2: If deposits of prehistoric or historic archeological materials are encountered during Project activities, all work within 25 feet of the discovery will be stopped and a qualified archeologist meeting federal criteria under 36 CFR 61 will be contacted to assess the deposit(s) and make recommendations.

While deposits of prehistoric or historic archeological materials should be avoided by Project activities, if the deposits cannot be avoided, they will be evaluated for their potential historic significance. If the deposits are recommended to be non-significant, avoidance is not necessary. If the deposits are determined to be potentially significant, they will be avoided. If avoidance is not feasible, Project impacts will be mitigated in accordance with the recommendations of the evaluating archaeologist and CEQA Guidelines §15126.4 (b)(3)(C), which require development and implementation of a data recovery plan that would include recommendations for the treatment of the discovered archaeological materials. The data recovery plan will be submitted to EBMUD for review and approval. Upon approval and completion of the data recovery program, Project construction activity within the area of the find may resume, and the archaeologist will prepare a report documenting the methods and findings. The report will be submitted to EBMUD. Once the report is reviewed and approved by EBMUD, a copy of the report will be submitted to the Northwest Information Center.

Significance after Mitigation: Less than Significant.

Impact 3.5-3: Damage to previously unidentified human remains.

Ground disturbing activities associated with site preparation, grading, and construction activities could disturb human remains, including those interred outside of formal cemeteries. The potential to uncover Native American human remains exists in locations throughout California. Although not anticipated, human remains may be identified during site-preparation and grading activities, resulting in a significant impact to Native American cultural resources. Implementation of the following mitigation measure would reduce potential adverse impacts to human remains to a less than significant level.

Measure 3.5-3: Section 7050.5(b) of the California Health and Safety code will be implemented in the event that human remains, or possible human remains, are located during Project-related construction excavation. Section 7050.5(b) states:

In the event of discovery or recognition of any human remains in any location other than a dedicated cemetery, there shall be no further excavation or disturbance of the site or any nearby area reasonably suspected to overlie adjacent remains until the coroner of the county in which the human remains are discovered has determined, in accordance with Chapter 10 (commencing with Section 27460) of Part 3 of Division 2 of Title 3 of the Government Code, that the remains are not subject to the provisions of Section 27492 of the Government Code or any other related

provisions of law concerning investigation of the circumstances, manner and cause of death, and the recommendations concerning treatment and disposition of the human remains have been made to the person responsible for the excavation, or to his or her authorized representative, in the manner provided in Section 5097.98 of the Public Resources Code.

The County Coroner, upon recognizing the remains as being of Native American origin, is responsible to contact the Native American Heritage Commission within 24 hours. The Commission has various powers and duties, including the appointment of a Most Likely Descendant to the Project. The Most Likely Descendant, or in lieu of the Most Likely Descendant, the Native American Heritage Commission, has the responsibility to provide guidance as to the ultimate disposition of any Native American remains.

Significance after Mitigation: Less than Significant.

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3.6 Traffic and Circulation

3.6.1 Approach to Analysis

This section of the Estates Reservoir Replacement Project EIR is based on the *Traffic and Circulation Technical Report* (Fehr & Peers 2009).

The evaluation of potential traffic and circulation impacts was based on the following information:

- Field reconnaissance of the Project site and surrounding roadway network, including intersection control, lane configurations, roadway widths, on-street parking, sight distance, pedestrian and bicycle facilities, and transit routes.
- Traffic volume counts for local roadways and intersections on a typical weekday (Tuesday – Thursday).
- Estimated Project -generated daily and peak-hour trips for each construction phase.

Analysis Methods

The operations of roadway facilities are described with the term "level of service" (LOS). LOS is a qualitative description of traffic flow based on factors such as speed, travel time, delay, and freedom to maneuver. Six levels of service are defined ranging from LOS A (i.e., best operating conditions) to LOS F (worst operating conditions). LOS E corresponds to operations "at capacity." When volumes exceed capacity, stop-and-go conditions result and operations are designated as LOS F. The City of Oakland strives to maintain LOS D, although LOS E is permitted at intersections within the downtown area.

Different criteria and methods were used to assess operating conditions for the various types of facilities analyzed in this study, including signalized and unsignalized intersections, and roadway segments. The LOS criteria and methods for each of these facilities are described in the following sections.

Signalized Intersections

Traffic conditions at signalized intersections were evaluated using the method from Chapter 16 of the Transportation Research Board's *2000 Highway Capacity Manual*. This operations analysis method uses various intersection characteristics (such as traffic volumes, lane geometry, and signal phasing) to estimate the average control delay experienced by motorists traveling through an intersection. Control delay incorporates delay associated with deceleration, acceleration, stopping, and moving up in the queue. **Table 3.6-1** summarizes the relationship between average delay per vehicle and LOS for signalized intersections. The analysis software Traffix version 7.9 was used to calculate signalized intersection LOS.

TABLE 3.6-1
Signalized Intersection Level of Service Criteria

Level of Service	Description	Average Control Delay per Vehicle (Seconds)
A	Operations with very low delay occurring with favorable progression and/or short cycle lengths.	≤ 10.0
B	Operations with low delay occurring with good progression and/or short cycle lengths.	> 10.0 to 20.0
C	Operations with average delays resulting from fair progression and/or longer cycle lengths. Individual cycle failures begin to appear.	> 20.0 to 35.0
D	Operations with longer delays due to a combination of unfavorable progression, long cycle lengths, and/or high volume-to-capacity ratios. Many vehicles stop and individual cycle failures are noticeable.	> 35.0 to 55.0
E	Operations with long delays indicating poor progression, long cycle lengths, and high volume-to-capacity ratios. Individual cycle failures are frequent occurrences.	> 55.0 to 80.0
F	Operations with delays unacceptable to most drivers occurring due to over saturation, poor progression, or very long cycle lengths.	> 80.0

Source: Highway Capacity Manual (Transportation Research Board, 2000).

Unsignalized Intersections

Traffic conditions at unsignalized intersections were evaluated using the method from Chapter 17 of the *2000 Highway Capacity Manual*. With this method, operations are defined by the average control delay per vehicle (measured in seconds) for each movement that must yield the right-of-way. For all-way stop-controlled intersections, the average control delay is calculated for the intersection as a whole. This incorporates delay associated with deceleration, acceleration, stopping and moving up in the queue. At two-way or side street-controlled intersections, the control delay (and LOS) is calculated for each controlled movement, the left-turn movement from the major street, and the entire intersection. For controlled approaches composed of a single lane, the control delay is computed as the average of all movements in that lane. The delays for the entire intersection and for the movement or approach with the highest delay are reported. **Table 3.6-2** summarizes the relationship between delay and LOS for unsignalized intersections.

TABLE 3.6-2
Unsignalized Intersection Level of Service Criteria

Level of Service	Description	Average Control Delay per Vehicle (Seconds)
A	Little or no delays	≤ 10.0
B	Short traffic delays	> 10.0 to 15.0
C	Average traffic delays	> 15.0 to 25.0
D	Long traffic delays	> 25.0 to 35.0
E	Very long traffic delays	> 35.0 to 50.0
F	Extreme traffic delays with intersection capacity exceeded	>50.0

Source: Highway Capacity Manual (Transportation Research Board, 2000).

Roadway Segments

Operations of the roadway segments were evaluated by comparing roadway segment volumes to their theoretical capacities. The definition of the traffic capacity of a local residential street is subjective and depends upon many factors such as housing set-backs, street width, presence of on-street parking, location (downtown, suburban, rural), and the connectivity of adjacent streets. Even two-lane local residential streets are physically capable of carrying volumes in excess of 7,000 vehicles per day, where the constraint on capacity is typically the traffic control at each intersection (i.e., stop signs or signal). Based on guidance from the Institute of Transportation Engineers publication Transportation and Land Development, 2002 (Table 13-6), the daily capacity of the roadway segments surrounding the Project site is 3,000 vehicles per day where two-way travel occurs, and 1,500 where the roadway narrows and two-way travel is constrained.

3.6.2 Setting/Regulatory Framework

Existing Traffic Circulation Network

Figure 3.6-1 shows the circulation network in the vicinity of the Project site.

Regional Roadways

State Route 13 (SR13) is a four-lane, north-south freeway that connects State Route 24 (SR 24) and Interstate 580 (I-580) in the City of Oakland. SR 13 is a designated truck route between Interstates 80 (I-80) and I-580, with a maximum truck length of 40 feet from kingpin to rear axle and 65 feet overall.

Local Roadways

Moraga Avenue is an east-west road that connects Pleasant Valley Avenue and SR 13. It is a two-lane road west of SR 13 and a four-lane road under SR 13. East of SR 13, Moraga Avenue turns south and meets Mountain Boulevard at La Salle Avenue. Adjacent land uses are residential west of SR 13, with a retail center east of SR 13. On-street parking is provided on both sides of Moraga Avenue between Thornhill Avenue and Park Boulevard. A Class III bike route (bicyclists share the road with vehicles) is designated on Moraga Avenue east of SR 13, continuing south along Mountain Boulevard.

Mountain Boulevard is a north-south arterial that runs parallel to SR 13, connecting the Lincoln Avenue, Park Boulevard, Moraga Avenue, and Broadway Terrace interchanges on SR 13. Along most of its length, it is a two-lane road with residential land uses on either side. Near La Salle Avenue, Mountain Boulevard is four lanes, with a Class III bike route and surrounding retail uses. There is one school on Mountain Boulevard (Montclair Elementary at 1757 Mountain Boulevard), but it is not located along the recommended truck route.

Estates Drive is a two-lane north-south residential street that carries traffic between Moraga Avenue and Park Boulevard. Although the roadway provides for two-way travel, some portions of the roadway do not provide standard width travel lanes. The roadway is 30 feet wide south of Moraga Avenue, narrows to about 18 feet south of McAndrew Drive, and widens to 24 feet next to the Estates Reservoir entrance. Where the roadway narrows to less than 20 feet, it is difficult to provide for two way travel. On-street parking exists on most sections of Estates Drive near the Project site.

Park Boulevard is a four-lane east-west road that carries traffic between SR 13 and I-580. There are two schools along Park Boulevard between Estates Drive and SR 13 (Corpus Christi at 1 Estates Drive, and Zion Lutheran at 5201 Park Boulevard), with residential uses to the west of Estates Drive. No on-street parking is provided on Park Boulevard between Estates Drive and SR 13.

La Salle Avenue is a two-lane east-west residential street that connects the east and west sides of SR 13. On-street parking is prohibited on the north side of La Salle Avenue between SR 13 and Estates Avenue between the hours of 7:00 a.m. and 7:00 p.m.

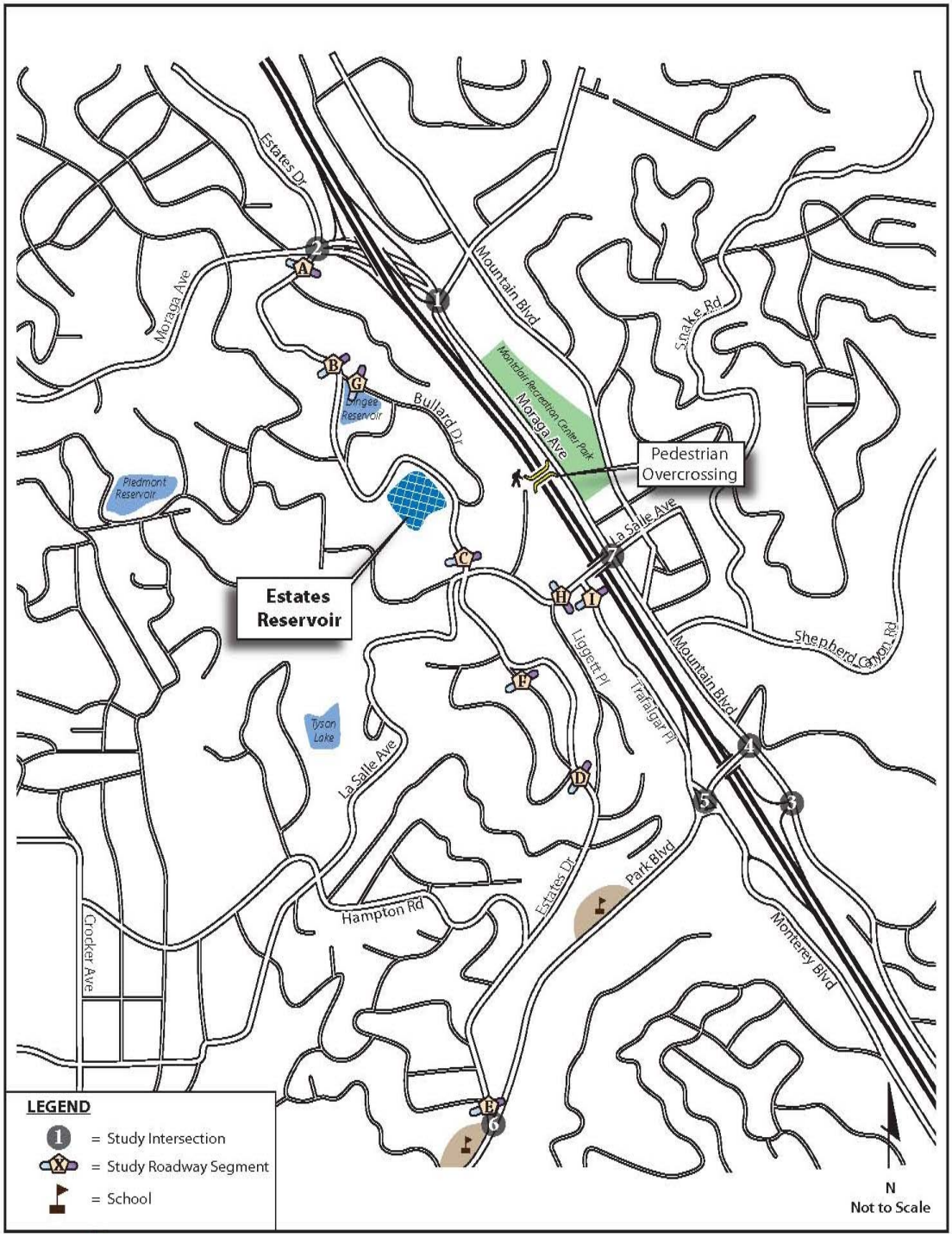
Traffic Volumes

Automatic machine traffic counts were conducted over a 48-hour period on clear days with area schools in normal session on residential streets near the Estates Reservoir. The average daily traffic volumes on these roadways are summarized below in **Table 3.6-3** and on **Figure 3.6-2**. Estates Drive, Dawes Street, Bullard Street and Trafalgar Place experience traffic volumes well below the daily capacity of 3,000 vehicles per day. The short segment of La Salle Avenue, between of Estates Drive and Moraga Boulevard carries over 4,000 vehicles per day. However, traffic dissipates past the La Salle Avenue/ Liggett Drive intersection, as vehicles filter through the neighborhood.

Table 3.6-3
Existing Daily Traffic Volumes

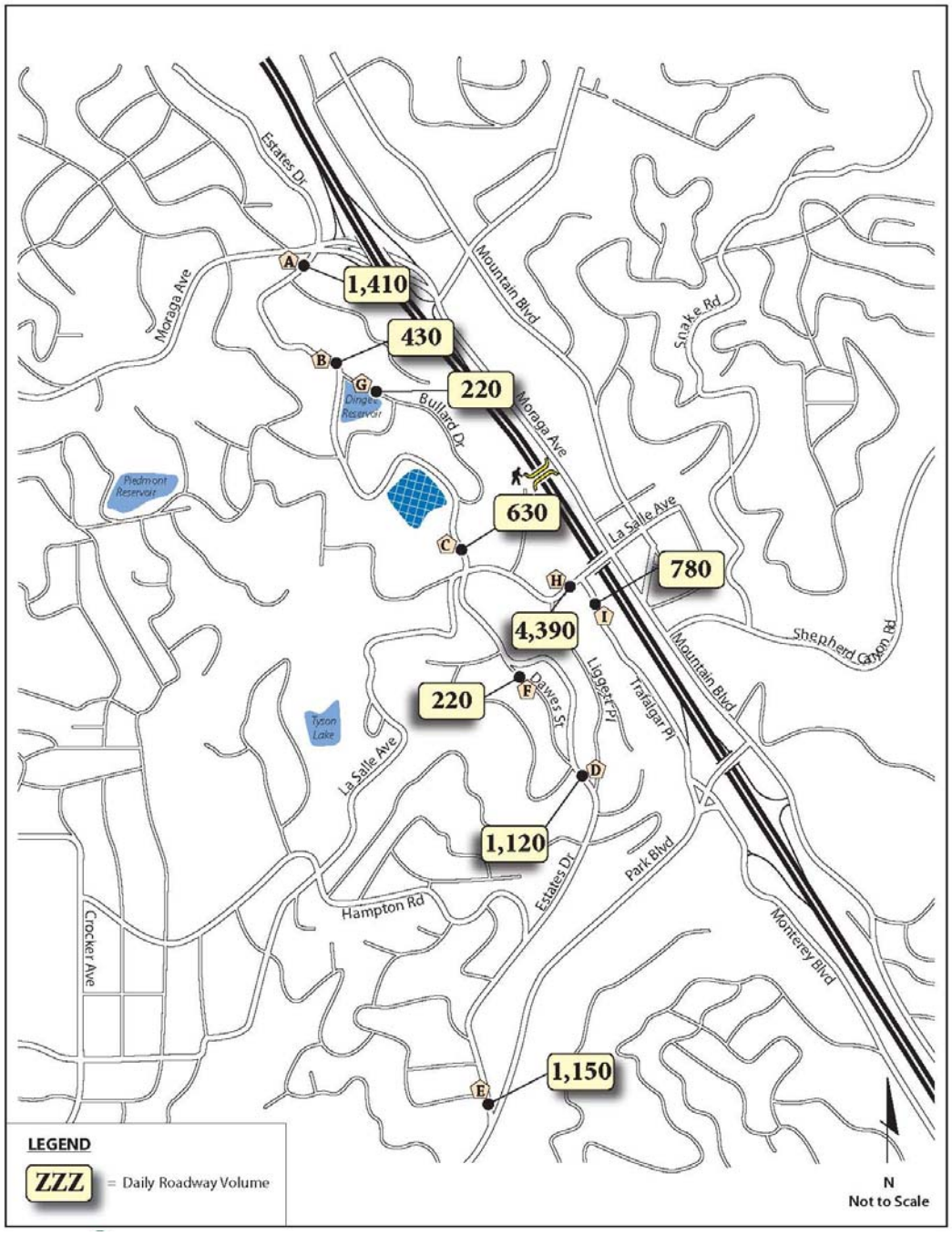
Roadway	Location	Average Daily Traffic[1]	AM Peak Hour[2]	PM Peak Hour[3]
A. Estates Drive	South of Moraga Avenue	1,410	122	131
B. Estates Drive	North of Bullard Drive	430	36	47
C. Estates Drive	North of La Salle Avenue	630	55	66
D. Estates Drive	South of Dawes Street	1,120	139	90
E. Estates Drive	North of Hampton Road	1,150	144	85
F. Dawes Street	South of Estates Drive	220	33	19
G. Bullard Drive	South of Estates Drive	220	25	33
H. La Salle Avenue	West of Trafalgar Place	4,390	394	393
I. Trafalgar Place	South of La Salle Avenue	780	90	84

Source: Fehr & Peers 2009, based on counts taken by Auto-Census.
Notes: 1 Average of daily two-way traffic.
2 Maximum hourly volume between the hours of 7 a.m. and 9 a.m.
3 Maximum hourly volume between the hours of 4 a.m. and 6 p.m.



Source Fehr & Peers, 2009

Project Site Vicinity and Analysis Locations
Figure 3.6-1



Source Fehr & Peers, 2009

Existing Daily Roadway Volumes
Figure 3.6-2

Peak period traffic counts were conducted between 7:00 a.m. and 9:00 a.m. and 4:00 p.m. and 6:00 p.m. on a clear day with area schools in normal session at the following intersections:

- SR 13/Moraga Avenue/Thornhill Road (signalized)
- Moraga Avenue/Estates Drive (unsignalized)
- SR 13 Northbound Ramps/Mountain Boulevard (unsignalized)
- Park Boulevard/Mountain Boulevard (signalized)
- SR 13 Southbound Ramps/Park Boulevard(signalized)
- Park Boulevard/Estate Drive (unsignalized)
- La Salle Avenue/Moraga Avenue (signalized)

The intersection locations were shown previously on **Figure 3.6-1**. For each intersection, the single hour with the highest traffic volumes during the two count periods was identified. The peak-hour volumes are presented on **Figure 3.6-3**. The peak-hour data is used as the basis for intersection operations analysis. Existing intersection lane configurations and traffic control are also shown on **Figure 3.6-3**. Traffic count worksheets are provided in the Traffic and Circulation Technical Report (Fehr & Peers 2009).

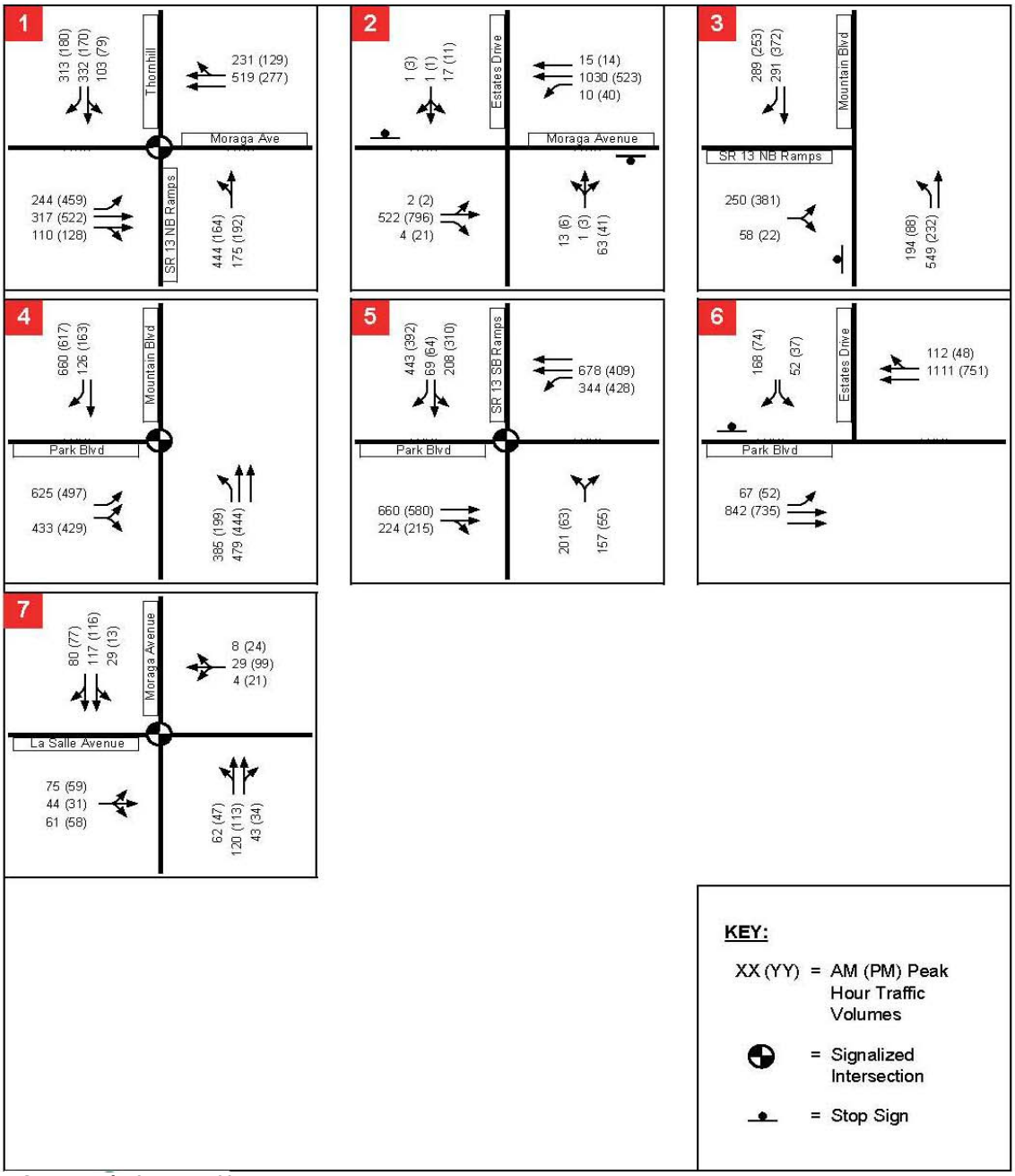
Existing peak-hour intersection operations are summarized in **Table 3.6-4**, corresponding to the same intersection designations labeled in **Figure 3.6-3**. Analysis methods are discussed in Section 3.6.1. Many of the study intersections currently operate poorly, characterized by long delays. Three of the signalized intersections in the study area operate at LOS E or F during the morning peak hour.

TABLE 3.6-4
Existing Intersection Operations

Intersection	Control	Peak Hour	Delay	LOS
SR 13/Moraga Avenue/Thornhill Road	Signal	AM	**101**	**F**
		PM	47	D
Moraga Avenue/Estates Drive	Side-Street Stop[1]	AM	3 **(SB 130)**	A **(F)**
		PM	2 **(SB 40)**	A **(E)**
SR 13 Northbound Ramps/Mountain Boulevard[2]	Side-Street Stop[1]	AM	**131 (EB 692)**	**F (F)**
		PM	**63 (EB 208)**	**F (F)**
Park Boulevard/Mountain Boulevard	Signal	AM	**103**	**F**
		PM	48	D
SR 13 Southbound Ramps/Park Boulevard	Signal	AM	**76**	**E**
		PM	35	D
Park Boulevard/Estates Drive	Side-Street Stop[1]	AM	13 (**SB 134**)	B (**F**)
		PM	2 (SB 22)	A (C)
Moraga Avenue/La Salle Avenue	Signal	AM	21	C
		PM	23	C

Source: Fehr & Peers 2009

Notes 1 For side-street-stop intersections, average delay is listed first followed by the delay for the worst approach.
2 A traffic signal has been constructed and activated.



Source: Fehr & Peers, 2009

Existing Conditions - Peak Hour Traffic Volumes, Lane Configurations, and Traffic Controls
Figure 3.6-3

The unsignalized Moraga Avenue/Estates Drive (Intersection 2) and Park Boulevard/ Estates Drive (Intersection 6) intersections operate at an overall acceptable service level during both the morning and evening peak hours. However, vehicles turning from Estates Drive to either Moraga Avenue or Park Boulevard experience deficient conditions with high delays during the morning peak hour.

The recently signalized SR 13 Northbound Ramps/Mountain Boulevard (intersection 3) now operates at acceptable levels of service. Level of service worksheets are provided in the technical report (Fehr & Peers 2009).

Existing Transit Service

The Project site is served by Alameda-Contra Costa Transit bus Lines CB, 59, 59A, 305, 360, 18, and V, with stops on Moraga Avenue. Lines V and CB provide service to the Transbay Terminal in San Francisco, Line 18 provides service to downtown Oakland and the Berkeley Bay Area Rapid Transit (BART) Station via Park Boulevard, Line 59 provides service to downtown Oakland and the 12th Street BART station, and Lines 305 and 360 provide local service to the residential areas east of SR 13. Line 41 provides service along Hampton Road, through the residential neighborhood southwest of the Project site.

Existing Pedestrian/Bicycle Circulation

Pedestrian facilities include sidewalks, crosswalks, and pedestrian signals. Sidewalks are generally not provided within the neighborhood surrounding the Estates Reservoir, although sidewalks are provided on portions of Moraga Avenue on the east side of SR 13. A pedestrian bridge over SR 13 and Moraga Avenue connects the Estates neighborhood, at Bruns Court, to the Montclair Recreation Center Park on the east side of Moraga Avenue. Sidewalks are provided on portions of La Salle Avenue, on the approach to the SR 13 overcrossing, where sidewalks are provided on both sides of the street, connecting to the sidewalk network on Moraga Avenue.

An informal walking trail is provided along a portion of the Estates Reservoir frontage, although the trail is not paved and is on EBMUD property. As part of the Project, the trail around the site would be improved, and a low wooden fence separating the roadway and path would be constructed, providing a benefit to the community. Four entries to the trail system are proposed at locations that maximize sight distance to the roadway network, as there are no sidewalks in the study area and pedestrians share the roadway with vehicles.

Bicycle facilities include:

- Bike paths (Class I) – Paved trails that are separated from roadways.
- Bike lanes (Class II) – Lanes on roadways designated for use by bicycles through striping, pavement legends, and signs.
- Bike routes (Class III) – Designated roadways for bicycle use by signs only; may or may not include additional pavement width for cyclists.

Portions of Moraga Avenue and Mountain Boulevard in the study area are designated Class III bicycle route on the east side of SR 13.

3.6.3 Impacts and Mitigations Measures

Significance Criteria

Based on the CEQA Guidelines, a significant impact to traffic and circulation would occur if the Project would:

- Cause an increase in traffic which is substantial in relation to the existing traffic load and capacity of the street system.
- Exceed, either individually or cumulatively, a level of service standard established by the local county congestion management agency (LOS D in the study area).
- Substantially increase hazards due to a design feature.
- Result in inadequate emergency access.
- Result in inadequate parking capacity.
- Conflict with adopted policies, plans, or programs supporting alternative transportation.

EBMUD is exempt from local government and building ordinances for projects related to the production, generation, storage and transmission of water pursuant to Section 53091 of the State Planning, Zoning and Development Laws. This exemption applies to the proposed Project. However, EBMUD is nevertheless responsive to local government ordinances where feasible.

The duration of Project impacts are limited to the construction period, as trip generation characteristics after construction would be similar to those before construction. Therefore, the mitigation measures below are designed to reduce the impact of the short-term effects of construction traffic.

Impacts and Mitigation Measures

Impact 3.6-1: The construction phase of the proposed Project would generate short-term vehicle trips by trucks and construction workers and would represent an increased traffic load on the roadways surrounding the Project site.

Trip Generation - Project trips would be generated during the construction phase as trucks and workers travel to and from the site. Separate estimates were generated for the reservoir replacement and pumping plant upgrade project elements.

Reservoir Replacement - EBMUD has identified a preliminary construction schedule and the number of trucks and workers anticipated for each phase. The estimates were based on the amount of material at the site that would require removal and disposal, and the import of new material.

The following assumptions were used in the development of the trip generation estimates by phase:

- Less than 3,000 cubic yards of material would be hauled from the site.
- 6,000 cubic yards of fill material would be hauled to the site (4,100 cubic yards if most of the concrete is recycled).
- Concrete lining of existing reservoir would be crushed and re-used on site.
- Single box trucks with a capacity of 10 cubic yards would be used to and are assumed to have an effective capacity of 5 to 7 cubic yards.
- 1,100 cubic yards of concrete is recycled on site.

Based on the anticipated construction schedule summarized in **Table 3.6-5**, the expected maximum number of daily trips would be 150 truck trips and 50 on-site worker trips for a total of 200. The expected maximum number of peak hour trips would be 22 truck trips and 17 worker trips for a total of 39. Peak traffic rates related to the demolition and construction phases do not extend over the entire duration of each phase. For example, peak traffic conditions associated with concrete deliveries for the floor, roof and wall pours for each tank are each separate one-day events spaced several weeks apart.

Each concrete pour for a tank floor or roof would be completed in one day; a tank wall section (representing about 1/7 of the tank perimeter) would also be poured in a single day, and spaced about 14 days apart under ideal conditions. Peak traffic rates related to hauling of demolition debris and the importation of fill for site grading and landscaping would span but a few weeks within the overall duration identified.

The traffic generation characteristics for the Project were also determined for a "typical" or average day. This represents the level of activity that the area would experience on a day-to-day basis. The proposed Project is expected to generate 44 daily truck trips and 30 daily worker trips for a total of 74 daily trips. The expected peak hour trips would be 7 truck trips and 10 worker trips for a total of 17 hourly trips.

Trucks behave differently than passenger vehicles as they take longer to accelerate, decelerate, and negotiate turns. Therefore, they also affect intersection and roadway operations differently.

Montclair Pumping Plant Upgrade

Construction associated with upgrade of the pumping plant would occur once the reservoir replacement is completed. The construction schedule for the pumping plant upgrade is estimated to be 20 weeks, as summarized in **Table 3.6-6**. The expected maximum number of daily trips would be 3 truck trips and 4 on-site worker tips, for a total of 7 vehicle trips (installation of new motors and pumps and equipment testing). The expected maximum number of peak hour trips would be 2 truck trips and 2 worker trips. Vehicle and worker trips generated by the pumping plant upgrade would have little noticeable impact on traffic and circulation of the existing street system.

TABLE 3.6-5
Estates Reservoir
Construction Schedule and Trip Generation Estimates
(Includes trips to and from the site)

		Daily Trips		Hourly[1] Trips	
Construction Phase	**Duration (weeks)**	**Trucks[2]**	**Workers**	**Trucks[2&3]**	**Workers[3]**
Mobilization	1	8	4	2	1
Demolition					
Drain Reservoir	4	0	4	0	1
Remove Gravel Roofing	6	4	46	1	15
Remove Paneling	1	26	46	4	15
Remove Joists	1	8	46	2	15
Remove Girders	3	6	48	1	16
Remove Columns	3	6	46	1	15
Remove Lining	6	16	42	3	14
Installation					
Reservoir Foundation and Floor Slabs	12	120	46	18	15
Reservoir Walls	12	30	36	5	12
Reservoir Roofing	9	150	50	22	17
Valve Pit Piping/Valving	7	16	16	3	5
Field Testing & Startup	6	2	16	1	5
Backfilling & Grading	4	8	8	2	3
Site Restoration	4	16	16	3	5
Landscaping	8	58	16	9	5
Complete Civil Work	4	8	8	2	3
Demobilization	2	8	8	2	3

Source: EBMUD, Fehr & Peers
Notes: 1. Hourly trips refer to the number of trips expected to occur during the morning and evening peak hours.
2. Hourly truck trip estimates assume truck trips occur equally across a 7-hour workday, and rounded up to the nearest trip.
3. Hourly worker trip estimates assume one third of daily workers arrive during the peak hour.

TABLE 3.6-6
Montclair Pumping Plant Upgrade
Construction Schedule and Trip Generation Estimates
(Includes trips to and from the site)

Construction Phase	Duration (weeks)	Daily Trips		Hourly[1] Trips	
		Trucks[2]	Workers[3]	Trucks[2]	Workers[3]
Mobilization	1	1	2	1	1
Retrofit Motors & Electrical					
Install new MCC, Switchgear, Control Panel	4	2	2	1	1
Retrofit Motors & Electrical					
Remove Pump & Motor #1	1	2	3	1	1
Modify and Adapt Pump Mount #1	1	2	3	1	1
Install New Pump & Motor #1 & Test	2	3	4	1	2
Remove Pump & Motor #2	1	2	3	1	1
Modify and Adapt Pump Mount #2	1	2	3	1	1
Install New Pump & Motor #2 & Test	2	3	4	1	2
Remove Pump & Motor #3	1	2	3	1	1
Modify and Adapt Pump Mount #3	1	2	3	1	1
Install New Pump & Motor #3 & Test	2	3	4	1	2
Final Testing & Acceptance	1	2	2	1	1
Demobilization	2	1	2	1	1

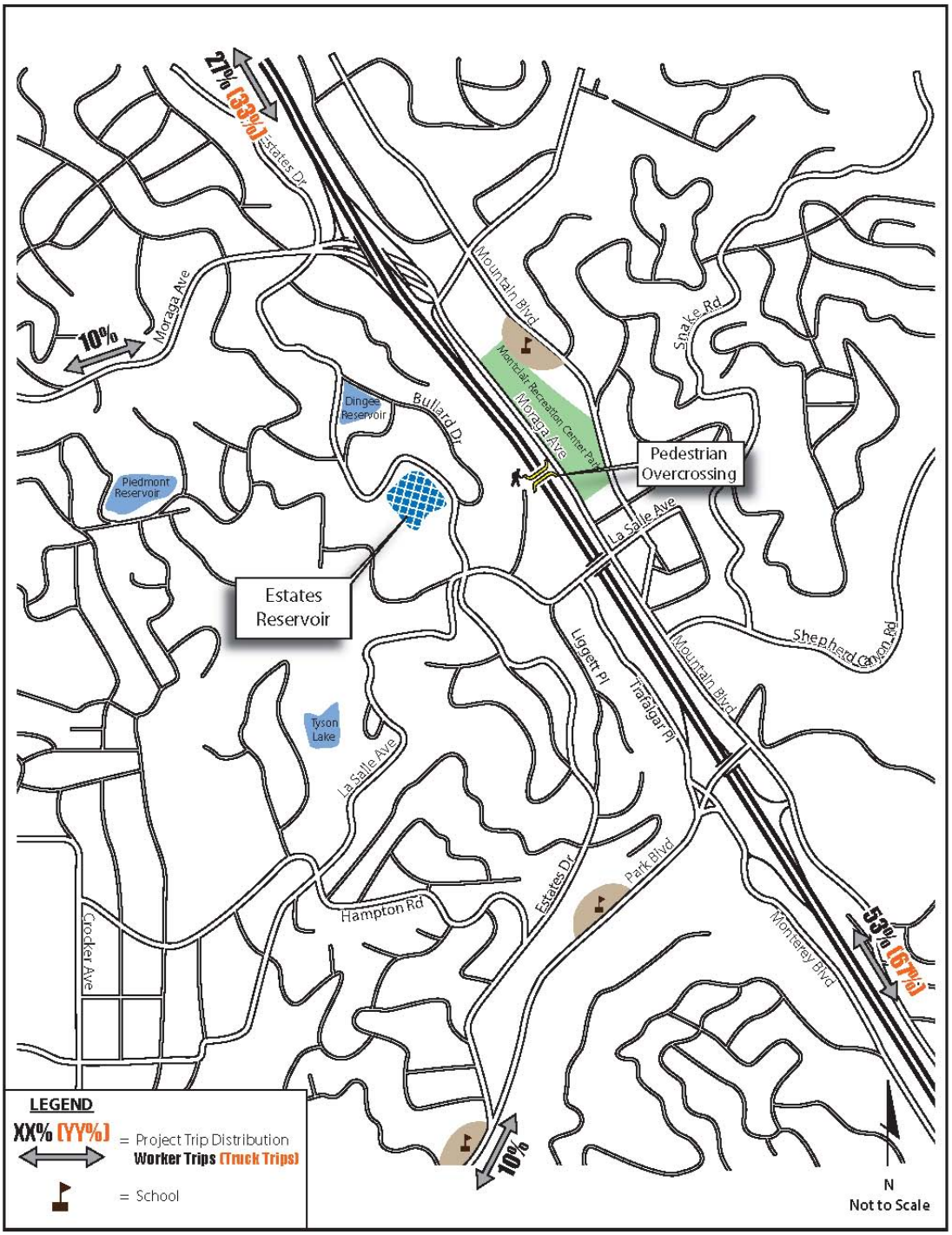
Source: EBMUD, Fehr & Peers
Notes: 1. Hourly trips refer to the number of trips expected to occur during the morning and evening peak hours.
2. Hourly truck trip estimates assume truck trips occur equally across a 7-hour workday, and rounded up toe the nearest trip
3. Hourly worker trip estimates assume one-third of daily workers arrive during the peak hour.

Trip Distribution

The Project would generate two types of trips - construction worker trips and truck trips. This section describes the distribution pattern of each.

Construction Worker Trip Distribution

It is expected that approximately 80 percent of site worker trips would generally access the site from SR 13, with 10 percent of trips from Moraga Avenue west and 10 percent from Park Boulevard west. Of the trips to/from SR 13, about one-third are expected from the north while the remaining two-thirds are expected from the south, as depicted on **Figure 3.6-4**. Worker trips from SR 13 to the north would access the Project site via the Moraga Avenue Interchange, and travel on Estates Drive to the Project site. Half of trips from SR 13 to the south were also assumed to access the Project site via the Moraga Avenue Interchange, with the other half using the Park Boulevard interchange. Those using the Park Boulevard interchange would travel on La Salle Avenue and Estates Drive to the Project site. Trips from Park Avenue, west of the study area, would probably filter through the neighborhood on Estates Drive from south of the site. While construction workers would be encouraged to remain on the main travel routes, some may deviate and travel on minor residential streets, such as Dawes Street, as these streets provide a more direct route to the site.



Source: Fehr & Peers 2009

Project Trip Distribution
Figure 3.6-4

Truck Trip Distribution

Routes to/from the site and the regional roadway network were reviewed in the development of a preliminary truck routing plan. Factors considered included the narrow width of Estates

Drive near the Project site, roadway geometry, circulation efficiency, dispersing impacts to residents and sensitive receptors (schools, recreation areas), and most importantly, truck, vehicle and pedestrian safety. It was assumed that all truck trips would use SR 13 to access the site. The recommended truck route plan, shown on **Figure 3.6-5** considered the topography, roadway width, intersection operations and traffic control, and number of driveways along the route.

The plan shows inbound truck traffic using Moraga Avenue/ Mountain Road to La Salle Avenue, where a SR 13 overcrossing is provided. A traffic signal at the Moraga Avenue/ La Salle Avenue intersection would allow trucks to make left-turn movements, although a flagger is needed at the intersection during peak periods (7:00 a.m. - 9:00 a.m. and 4:00 p.m. - 6:00 p.m.), due to the tight tuning radius from Moraga Avenue to La Salle Avenue. This flagger would also help left-turning trucks negotiate gaps in southbound traffic. Trucks would then enter the site from the south, turning left into the reservoir site. A flagger would be present at the Project driveway during construction hours.

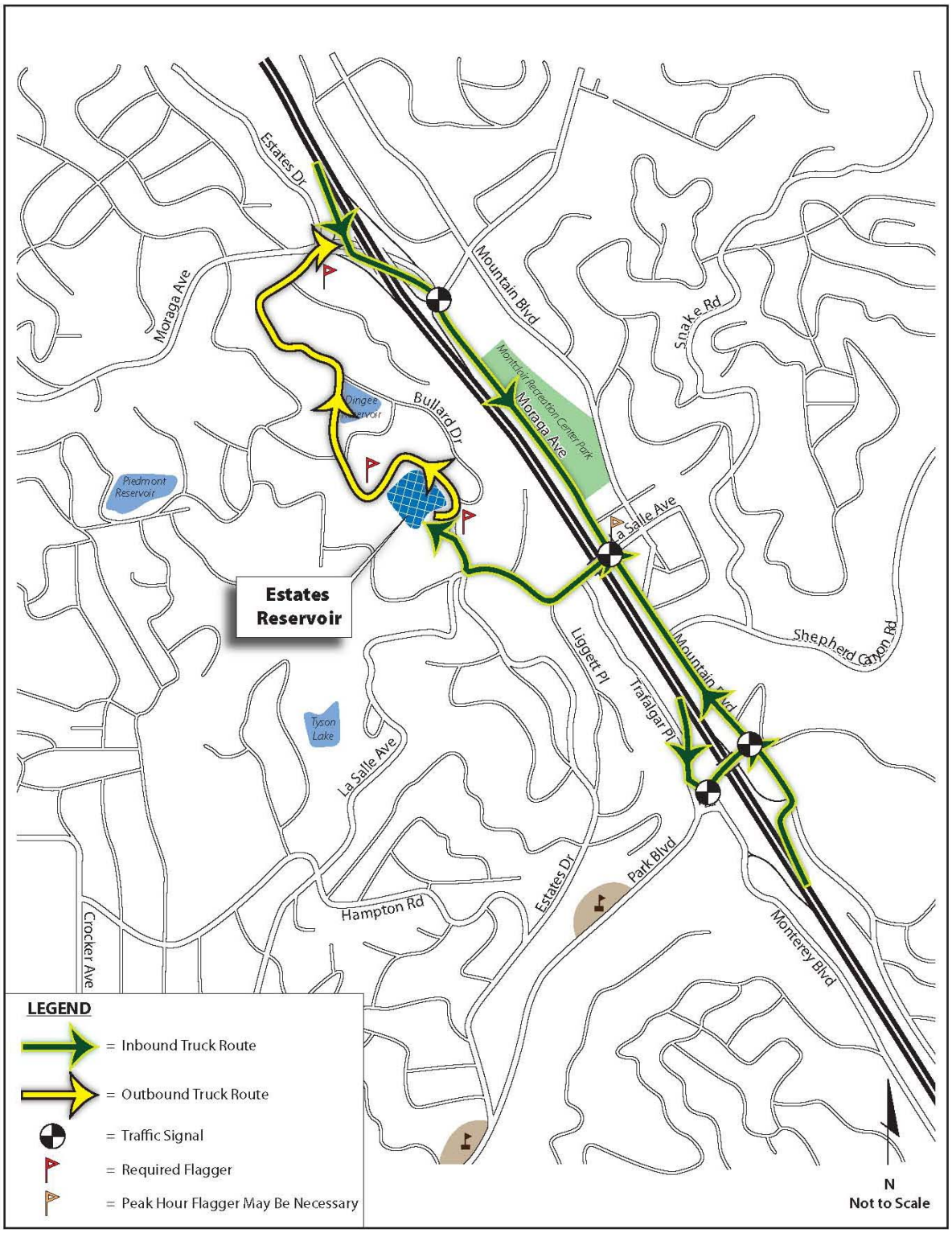
Outbound trucks would be directed to exit the site towards Estate Drive north, and travel on Estates Drive to Moraga Avenue, where they would turn right to access SR 13. As the side-street movement from Estates Drive to Moraga Avenue operates deficiently during the morning and evening peak hours, a flagger would be needed at that intersection during peak periods (7:00 a.m. - 9:00 a.m. and 4:00 p.m. - 6:00 p.m.).

Maximum and average daily volumes on local streets with the above trip generation and trip distribution assumptions are summarized below in **Table 3.6-7**. All streets would continue to operate below their theoretical daily capacity, except for La Salle Avenue, west of Trafalgar Place. The addition of Project traffic to this roadway segment would exacerbate an existing deficient condition, resulting in a near-term significant impact, based on the CEQA significance criteria. Estates Drive north of Bullard Drive would experience a traffic increase of about 53 percent on peak days of hauling, while the increase on a typical (or average day) would be 18 percent.

TABLE 3.6-7
Existing Daily Traffic Volumes Plus Construction Traffic

Roadway	Location	Existing Daily Traffic	Maximum Added Daily Traffic	Total Maximum Daily Traffic	Average Added Daily Traffic	Total Average Daily Traffic	Theoretical Daily Capacity
A. Estates Drive	South of Moraga Avenue	1,411	227	1,638	79	1,490	3,000
B. Estates Drive	North of Bullard Drive	430	227	657	79	509	1,500
C. Estates Drive	North of La Salle Avenue	625	200	825	62	687	3,000
D. Estates Drive	South of Dawes Street	1,117	6	1,123	4	1,121	3,000
E. Estates Drive	North of Park Boulevard	1,151	6	1,157	4	1,155	3,000
F. Dawes Street	South of Estates Drive	224	6	230	4	228	1,500
G. Bullard Drive	South of Estates Drive	217	6	223	4	221	1,500
H. La Salle Avenue	West of Trafalgar Place	**4,393**	195	**4,588**	59	**4,452**	3,000
I. Trafalgar Place	South of La Salle Avenue	775	6	781	4	779	3,000

Source: Fehr & Peers 2009; Transportation and Land Development, ITE, 2002.
Note: Daily capacities taken from Table 13-6 of the Institute of Transportation Engineers) Transportation and Land Development, 2002.



Source: Fehr & Peers 2009

Recommended Truck Routing Plan
Figure 3.6-5

Peak-hour intersection operations with maximum and average construction traffic volumes assigned to the roadway network are summarized in **Table 3.6-8**. The intersection operations below consider the passenger-car equivalent trips generated during the construction period.

As shown in **Table 3.6-8**, Project construction traffic is not expected to significantly degrade signalized intersection operations from an acceptable level to an unacceptable level. The added Project traffic at locations projected to operate at LOS E does not degrade the intersection operations by four or more seconds. At locations operating at LOS F, the Project does not add two or more seconds of delay. Thus, the added Project traffic is considered to have a less than significant impact to signalized intersection operations considering the CEQA Guidelines Appendix G significance criteria and the City of Oakland significance criteria.

The unsignalized Moraga Avenue/Estates Drive intersection would not satisfy Caltrans peak hour signal warrants, although the proposed Project would add more than ten peak hour trips to the intersection. Although the impact at this location is less than significant, the use of a flagger at this intersection to provide manual traffic control for construction related traffic exiting Estates Drive would mitigate the short-term temporary impact at this intersection.

TABLE 3.6-8
Existing Plus Construction Traffic Intersection Operations

			Existing		Existing Plus Average Construction Activity		Existing Plus Maximum Construction Activity	
Roadway	**Control**	**Peak Hour**	**Delay**	**LOS**	**Delay**	**LOS**	**Delay**	**LOS**
SR 13/Moraga Avenue/ Thornhill Road	Signal	AM	**101**	**F**	**101**	**F**	**101**	**F**
		PM	47	D	47	D	47	D
SR 13/Moraga Avenue/ Estates Drive	Side-Street Stop[1]	AM	3 **(SB 130)**	A **(F)**	3 **(SB 140)**	A **(F)**	3 **(SB 161)**	A **(F)**
		PM	2 **(SB 40)**	A **(E)**	2 **(SB 66)**	A **(F)**	3 **(SB 76)**	A **(F)**
SR 13/Mountain Boulevard	Side-Street Stop/Signal[2]	AM	**131 (EB 692)**	**F (F)**	23	C	23	C
		PM	**63 (EB 208)**	**F (F)**	22	C	23	C
Park Boulevard/ Mountain Boulevard	Signal	AM	**103**	**F**	**103**	**F**	**103**	**F**
		PM	48	D	48	D	48	D
Park Boulevard/ Trafalgar Place/ Monterrey Boulevard	Signal	AM	**76**	**E**	**76**	**E**	**76**	**E**
		PM	35	D	35	D	35	D
Park Boulevard/Estates Drive	Side-Street Stop	AM	13 (**SB 134**)	B (**F**)	13 **(SB 135)**	B **(F)**	13 **(SB 136)**	A **(F)**
		PM	2 (SB 22)	A (C)	2 (SB 22)	A (C)	2 (SB 22)	A (C)
Moraga Avenue/La Salle Avenue	Signal	AM	21	C	21	C	21	C
		PM	23	C	23	C	23	C

Source: Fehr & Peers 2009, based on counts taken by Auto-Census
Notes: 1 For side-street-stop intersections, average delay is listed first followed by the delay for the worst approach.
2 The signal at this intersection has been activated.

Traffic signal warrants are satisfied at the Park Boulevard/Estates Drive prior to the addition of Project traffic. However, the recommended haul routes do not include this intersection; and fewer than ten additional trips are expected to travel through this intersection during either the morning or evening peak hour as a result of this Project. Therefore, the impact to this intersection would be less than significant and no mitigation is required for this location. Level of service worksheets are provided in the technical report (Fehr & Peers, 2009).

Construction traffic would also temporarily reduce the traffic speed on Estates Drive and La Salle Avenue as trucks would travel more slowly through the area. Additionally, transit riders could potentially be delayed when buses along the proposed haul routes travel behind construction vehicles.

The narrow width of the reservoir access driveway would require flaggers to control two-way traffic flow of trucks entering and exiting the site. Inbound trucks should be given priority over outbound trucks to minimize truck queuing on local streets. Flaggers are also recommended to control traffic flow at the sharp curve on Estates Drive just west of the reservoir (see **Figure 3.6-5**), where the roadway narrows to 18 feet and sight distance is reduced to approximately 80 feet.

The recommended truck haul routes are shown on **Figure 3.6-5**, and would not pass by sensitive land uses such as schools or hospitals, although the route along Moraga Avenue north of La Salle Avenue would pass by the Montclair Recreation Area and retail uses on Moraga Avenue and Mountain Avenue. There is a pedestrian overcrossing from the Estates neighborhood over SR 13 and Moraga Avenue, which minimizes at-grade pedestrian crossings on Moraga Avenue, therefore pedestrian-truck conflicts are expected to be limited during the construction period.

When Project construction is completed, the Project site's trip generation would revert to existing levels, and therefore no long-term impacts are expected.

In summary, there are two significant impacts that would result from trips generated by the proposed Project in the short term:

Impact 3.6-1a: The addition of traffic during the construction phase of the Project would exacerbate an existing deficiency on La Salle Avenue, west of Trafalgar Place. Based on the CEQA significance criteria, this is considered a significant impact.

Impact 3.6-1b: The addition of traffic during the construction phase of the Project would exacerbate an existing deficiency at the SR 13/Moraga Avenue/Estates Drive intersection. Construction traffic would also increase traffic on Estates Drive in locations where the roadway is not wide enough to support two-way travel, potentially creating a traffic hazard. An inadequate turning radius at the La Salle Avenue/Moraga Avenue intersection does not allow for conflict free (from opposing vehicles) truck turning movements. Construction related traffic could create potential conflicts between transit

buses, pedestrians, and bicyclists. Based on the significance criteria, these impacts are considered significant.

Mitigation Measure 3.6-1: EBMUD contract specifications shall require preparation and implementation of a Traffic Management Plan, and collaboration with the City and California Highway Patrol, as appropriate. The Plan shall include the following elements:

- The work hours for each phase of Project construction, the process for notifying residents of construction activity, and the means for people to report construction-related problems.
- A haul route, based on the route shown on **Figure 3.6-5** that shall be provided to all trucks serving the site during the construction period. Should the recommended one-way truck access route not be implemented and trucks routed to Estates Drive south of the Project site, sufficient capacity would exist on Estates Drive south of the Project site to accommodate additional traffic volumes associated with the peak construction period. However, a flagger would be required at the Estates Drive/Park Boulevard intersection to direct traffic though that intersection with an alternative routing plan.
- Flaggers at the site entrance and at the curve on Estates Drive immediately west of the Project site to improve traffic safety during regular construction hours.
- Flaggers at the Moraga Avenue/Estates Drive intersection during regular construction hours.
- A peak-period flagger (7:00 a.m. - 9:00 a.m. and 4:00 p.m. - 6:00 p.m.) at the La Salle Avenue/Moraga Avenue intersection.
- Control and monitoring of construction vehicle movements through the enforcement of construction specifications by EBMUD on-site inspectors.
- Signage on Estates Drive and La Salle Avenue warning motorists of the construction work ahead.
- Unimpeded through access to the Montclair Pumping Plant site at all times during reservoir construction.
- The Traffic Management Plan shall be enforced by EBMUD construction inspectors.

Significance after Mitigation: Impact 3.6-1a Significant and Unavoidable.
Impact 3.6-1b Less than Significant.

Impact 3.6-2: Construction of the proposed Project would generate a demand for parking to accommodate worker vehicles.

Approximately eight worker vehicles could park on Estates Drive on the dirt shoulder adjacent to the Project site. This level of on-site parking supply is not expected to be able to accommodate the projected worker parking demand during the majority of construction phases should parking not be provided on the interior of the site. Limited on-street parking is provided in the vicinity of the Project site and construction vehicles should not

be parked on the neighborhood streets for extended periods of time. This impact is considered significant but can be mitigated to less than significant.

> **Mitigation Measure 3.6-2**: EBMUD shall provide designated on-site parking areas to accommodate all Project-related parking demand. In the earlier construction phases when there may not be sufficient space on-site to accommodate all parking demand, EBMUD contract specifications will require the contractor to secure private off-site parking and provide shuttles to bring workers to and from the Project site.

Significance after Mitigation: Less than Significant.

Impact 3.6-3: Project construction would cause increased wear-and-tear on roadways used by construction vehicles to access the Project site.

Large trucks would be used to haul material to and from the Project site. Although arterials such as Moraga Avenue and Mountain Avenue are designed to withstand substantial truck volumes, minor residential roads such as La Salle Avenue and Estates Drive are not. These roadways would likely experience increased wear-and-tear as a result of Project construction.

The residential roadways around the Project site are not designed to accommodate high volumes of heavy vehicles and the addition of construction traffic could degrade roadway conditions in the immediate study area. This impact is considered significant but can be mitigated to less than significant.

> **Mitigation Measure 3.6-3:** EBMUD contract documents will require that road conditions shall be documented for all routes that would be used by construction vehicles both before and after Project construction.

Significance after Mitigation: Less than Significant.

References

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Institute of Transportation Engineers, *Transportation and Land Development*, 2002. Table 13-6.

Transportation Research Board, *Highway Capacity Manual*, 2000.

3.7 Air Quality

3.7.1 Approach to Analysis

This air quality impact analysis considers construction and operational impacts associated with the Estates Reservoir Replacement Project, including the reservoir replacement and pumping plant upgrade elements. Construction emissions are evaluated in accordance with Bay Area Air Quality Management District (BAAQMD) CEQA guidelines. Operational emissions are discussed qualitatively.

Construction Project emissions fall into three general categories: 1) on-site use of diesel-powered construction equipment, 2) on-site controlled (mitigated) fugitive dust generation from demolition and earthmoving activities, and 3) off-site vehicle traffic comprising Project -related trucking and Project worker commuting. The analysis of the Project's air quality impacts is based on equipment specifications and conservative planning estimates for the demolition and construction phases of the Project. These are included in the Air Quality Technical Report (ENTRIX 2009).

On-site Combustion Emissions

Table 3.7-1 shows estimated maximum fuel consumption for the Project based on equipment specifications and planning estimates for the demolition and construction phases provided by EBMUD. Actual fuel consumption will likely be less, with correspondingly lower emissions. California ultra-low sulfur diesel fuel with a maximum sulfur content of 15 parts per million (ppm) by weight will be used in all diesel-powered equipment to minimize sulfur dioxide and particulate emissions.

TABLE 3.7-1
Estimated Maximum Fuel Consumption for Project

Project Activity	Hourly gal/hr	Daily gal/day	Project gallons
Demolition Phase	90	530	15,000
Construction Phase	110	580	55,000
Project Total			70,000

Source: EBMUD 2009
Notes BSFC = (7,000 BTU/BHP-hr) / (137,030 BTU/gal) = 0.051 gal/BHP-hr
AP-42 Table 3.3-1

On-site Fugitive Dust Emissions

For land disturbance, fugitive dust (particulate matter 10 microns in diameter or less [PM_{10}]) was estimated as 51 pounds per acre-day unmitigated as specified in the BAAQMD CEQA Guidelines (BAAQMD 1999), Section 3.3; AP-42 Chapter 13.2.3

"Heavy Construction Operations;" and AP-42 Chapter 13.2.2 "Unpaved Roads," Figure 13.2.2-2 (USEPA 2006). For the BAAQMD control measures listed in Section 3.7.4 below, an equivalent soil to moisture ratio of 5:1 was assumed for all feasible measures, which reduces fugitive dust emissions by 95 percent from uncontrolled levels.

For demolition of the roof structure, fugitive dust (as PM_{10}) was estimated as 0.00042 pound per cubic foot of building volume unmitigated as specified in the BAAQMD CEQA Guidelines (BAAQMD 1999) Section 3.3 and AP-42 Chapter 13.2.3 "Heavy Construction Operations", where control for structure demolition is wet suppression, which is estimated to reduce dust emissions by about 75 percent for a nominal (average) moisture ratio.

EBMUD estimates that the reservoir roof area is about 109,000 square feet (2.5 acres) while the floor area of the existing basin is about 120,000 square feet (2.75 acres). The existing paved perimeter access road is about 1,300 feet in length, covering an area of about 0.5 acres. These areas were used to determine fugitive dust emissions using the BAAQMD protocol.

Off-site Vehicle Emissions

A relatively small source of emissions compared to on-site equipment, off-site vehicle emissions comprise heavy-duty truck emissions and emissions from worker commute trips in light-duty vehicles. Commuter trip estimates developed by EBMUD were used as the basis using the emissions estimation methodology given in the BAAQMD CEQA Guidelines Section 3.4, Tables 9, 10 and 11. Similarly, heavy-duty truck trip estimates developed by EBMUD were translated into emissions utilizing California Air Resource Board's (CARB) EMFAC 2007 computer program (i.e., determination of emission factors).

Dispersion Modeling

For on-site emissions, USEPA's SCREEN Version 96043 was used to model the Gaussian dispersion of emissions to obtain ambient impacts. For combustion emissions from construction equipment, a single equivalent point source (stack) was modeled to yield maximum potential downwind impact from the construction site, which is highly conservative and thus tends to overestimate impacts. Fugitive dust emissions were modeled as an equilateral area source with zero release height, which is also conservative and thus tends to overestimate impacts. For screening dispersion modeling, the annual average wind speed of 3.9 meters per second (NOAA 2008) was assumed for neutral Stability Class D. Detailed calculation and modeling templates are included in the Air Quality Technical Report (ENTRIX 2009).

3.7.2 Setting/Regulatory Framework

Meteorology

Temperatures in the Oakland area average about 60 degrees Fahrenheit annually, with summer highs in the mid-70s and winter lows in the mid-40s. Precipitation averages about 20 inches per year throughout much of the Bay Area, although annual precipitation varies markedly from year to year. Winds in the Oakland area are typically out of the west, west-northwest, and northwest (about 50 percent of the time). All other wind directions occur no more than 7 percent of the time, individually, and calm conditions occur during 16 percent of annual observations. Annual average wind speeds in the central Bay Area are 8.7 miles per hour (mph) or 3.9 meters per second (NOAA 2008).

During the day, localized emissions are funneled in a southeastward direction. At night, emissions are less readily ventilated and travel in more random directions. During the daytime, there is usually little potential for large-scale stagnation, with winds traveling at an average speed of about 8 to 9 mph. However, winds at night are less than 2 to 3 mph, about one-third of the time. Local radiation temperature inversions (where the ground is cooler than the air) may combine with these light winds to create localized air stagnation during the night near localized emission sources (e.g., freeways) (BAAQMD 2008b).

Criteria Air Pollutants

A criteria or regulated air pollutant is any air pollutant for which ambient air quality standards have been set by the USEPA or the CARB. Primary air quality standards are established to protect human (public) health. Secondary air quality standards are designed to protect public welfare from effects such as diminished production and quality of agricultural crops, reduced visibility, degraded soils, materials and infrastructure damage, and damaged vegetation. Criteria pollutants include ozone (O_3), nitrogen dioxide (NO_2), carbon monoxide (CO), sulfur dioxide (SO_2), respirable particulate matter (PM_{10}), and fine particulate matter ($PM_{2.5}$). The six most prevalent criteria pollutants and their potential health effects are described below:

Ozone

Ozone (O_3) is a pungent, colorless, toxic gas and is the major air pollutant of concern in California. O_3 is formed in the atmosphere by a series of complex chemical reactions and transformations in the presence of sunlight. Nitrogen oxides (NO_x) and reactive organic compounds (ROC)[16] are the principal constituents in these reactions. Nitrogen oxide NO_x and ROC emissions are predominantly attributed to mobile sources (on-road motor vehicles and other mobile sources) in the Bay Area (CARB 2007). Ozone can chemically burn and cause narrowing of airways, forcing

[16]Also referred to as reactive organic gases or volatile organic compounds.

the lungs and heart to work harder to provide oxygen to the body. A powerful oxidant, ozone is capable of destroying organic matter, including human lung and airway tissue (VCAPCD 2003).

Nitrogen Dioxide

Nitrogen dioxide (NO_2) is a reddish brown gas with an odor similar to that of bleach. It is formed in the atmosphere primarily by the rapid reaction of the colorless gas nitric oxide with atmospheric oxygen. Nitrogen dioxide participates in the photochemical reactions that result in ozone. The greatest source of nitric oxide, and subsequently nitrogen dioxide, is the high-temperature combustion of fossil fuels such as in motor vehicle engines and power plant boilers. Nitrogen dioxide can irritate and damage the lungs, cause bronchitis and pneumonia, and lower resistance to respiratory infections such as influenza (VCAPCD 2003).

Carbon Monoxide

Carbon monoxide (CO) is a common colorless, odorless, highly toxic gas. The major source of carbon monoxide in urban areas is incomplete combustion of carbon-containing fuels (primarily gasoline, diesel fuel, and natural gas). Nearly 90 percent of the carbon monoxide emitted in the Bay Area in 2006 was contributed by motor vehicles and other mobile sources (CARB 2007). Carbon monoxide diminishes the ability of blood to carry oxygen to the brain, heart, and other vital organs. Effects from carbon monoxide exposure include headaches, nausea, and death (VCAPCD 2003).

Sulfur Dioxide

Sulfur dioxide (SO_2) is a colorless gas with a sharp, irritating odor. Most of the sulfur dioxide emitted into the atmosphere is from burning sulfur-containing fossil fuels by mobile sources such as marine vessels and farm equipment, and stationary fuel combustion. Sulfur dioxide irritates the mucous membranes of the eyes and nose, and may also affect the mouth, trachea, and lungs (VCAPCD 2003).

Respirable Particulate Matter, 10 Micron (PM_{10})

PM_{10} consists of particulate matter, fine dusts and aerosols, 10 microns or smaller in diameter. The primary sources of PM_{10} include dust from paved and unpaved roads and construction and demolition operations. Diesel Particulate Matter (DPM) is considered a toxic air contaminant in California; once in the lungs, the toxic substances can be adsorbed into the bloodstream and carried throughout the body. PM_{10} particles contribute to aggravation of asthma, premature death, increased number of asthma attacks, bronchitis, reduced lung function, respiratory disease, aggravation of respiratory and cardiovascular disease, alteration of lung tissue and structure, changes in respiratory defense mechanisms, and cancer (VCAPCD 2003).

Fine Particulate Matter, 2.5 Micron ($PM_{2.5}$)

$PM_{2.5}$ is a mixture of particulate matter fine dusts and aerosols 2.5 microns or smaller in aerodynamic diameter. In the Bay Area, $PM_{2.5}$ particles are emitted primarily from area sources such as road dust, residential fuel combustion, and farming (CARB 2007). $PM_{2.5}$ can enter the deepest portions of the lungs where gas exchange occurs between the air and the blood stream. These are the most dangerous particles because the lungs have no efficient mechanisms for removing them. This increases the risks of long-term disease, including chronic respiratory disease, cancer, and increased and premature death. Other effects include increased respiratory stress and disease, decreased lung function, alterations in lung tissue and structure, and alterations in respiratory tract defense mechanisms (VCAPCD 2003).

Air Quality Regulations

The ambient air quality standards are intended to protect the public health and welfare and specify the concentration of pollutants (with an adequate margin of safety) to which the public may be exposed without adverse health effects. The standards are designed to protect those segments of the public most susceptible to respiratory distress in particular, children, elderly, and acutely ill and chronically ill persons, especially those with cardio-respiratory diseases such as asthma and bronchitis. Sensitive receptors (land uses) indicate locations where such individuals are typically found, namely schools, daycare centers, hospitals, convalescent homes, residences of sensitive persons, and parks with active recreational uses, such as youth sports. Healthy adults can tolerate occasional exposure to air pollution levels somewhat above the ambient air quality standards before adverse health effects are observed.

Air districts in California are required to monitor air pollutant levels to assure that the National Ambient Air Quality Standards (NAAQS) and California Ambient Air Quality Standards (CAAQS) are met and, in the event that they are not, to develop strategies to meet these standards. Depending on whether the standards are met or exceeded, the local air basin is classified as being in "attainment" or "nonattainment." The air pollutants of most concern in the Bay Area are ozone and particulate matter.

Federal Standards

The Clean Air Act of 1970 (CAA, amended 1977 and 1990, USC 7401 et seq.) requires that regional planning and air pollution control agencies prepare a regional air quality plan to outline the measures by which both stationary and mobile sources of pollutants can be controlled in order to achieve all standards by the deadlines specified in the act. For the San Francisco Bay Area Air Basin, the Association of Bay Area Governments (ABAG), the Metropolitan Transportation Commission, and BAAQMD jointly prepare the Bay Area Air Quality Plan. The plan must contain control strategies that demonstrate attainment with the NAAQS by the deadlines established in the Federal Clean Air Act.

The San Francisco Bay Area Air Basin is in NAAQS attainment except for 9-hour ozone, 24-hour PM_{10}, and 24-hour $PM_{2.5}$, as shown in **Table 3.7-1**. In general, the Bay Area experiences low concentrations of most pollutants when compared to federal standards, except for ozone and particulate matter, for which standards are exceeded periodically.

State Standards

In 1988, the state legislature passed the California Clean Air Act (California Health and Safety Code Section 39600 et seq.), which, like its federal counterpart, called for designations of areas as attainment or nonattainment, based on state rather than federal standards. As shown in **Table 3.7-2**, CAAQS tend to be at least as protective as NAAQS and often more stringent. The San Francisco Bay Area Air Basin is in CAAQS attainment except as listed in **Table 3.7-2**. In general, the Bay Area experiences low concentrations of most pollutants when compared to state standards, except for ozone and particulate matter, for which standards are exceeded periodically. However, localized concentrations of carbon monoxide, also known as carbon monoxide "hotspots" may occur at heavily traveled roadways, particularly at intersections or other locations where the traffic is congested and vehicles idle for prolonged periods. Carbon monoxide concentrations exceeding the existing standard may occur at intersections that operate at a LOS D or worse. Similar to the federal Clean Air Act, the California Clean Air Act also classifies areas according to pollution levels. Under the California Clean Air Act, the Bay Area is a "Serious" ozone nonattainment area and a state PM_{10} and $PM_{2.5}$ nonattainment area.

The California Air Resources Board (CARB) is the state agency responsible for regulating air quality. CARB responsibilities include establishing CAAQS, emissions standards, and regulations for mobile emissions sources (e.g., autos, trucks, etc.) as well as overseeing the efforts of countywide and multicounty air pollution control districts, which have primary responsibility over stationary sources. The emission standards most relevant to the proposed Project are those related to automobiles, light- and medium-duty trucks, and California heavy-duty truck and construction equipment engines. CARB also regulates vehicle fuels with the intent to reduce emissions.

The BAAQMD is the regional agency responsible for air quality regulation within the San Francisco Bay Area Air Basin. The BAAQMD regulates air quality through its planning and review activities. The BAAQMD has permit authority over most types of stationary emission sources and can require stationary sources to obtain permits; it can also impose emission limits, set fuel or material specifications, or establish operational limits to reduce air emissions. The BAAQMD regulates new or expanding stationary sources of toxic air contaminants.

For state air quality planning purposes, the Bay Area is classified by the California Clean Air Act as a nonattainment area for ozone. The "Serious" classification triggers the requirement that the Bay Area update the Clean Air Plan (CAP) to reflect progress in meeting the air quality standards and to incorporate new information regarding the

feasibility of control measures and new emission inventory data. The Bay Area's record of progress in implementing previous measures must also be reviewed. On January 4, 2006, the BAAQMD adopted the 2005 Ozone Strategy as the latest triennial update to the Bay Area strategy to achieve the state's 1-hour ozone standard.

TABLE 3.7-2
State and Federal Ambient Air Quality Standards

		California Standards			Federal Standards		
Pollutant	**Averaging Time**	**ppmv**	**µg/m^3**	**Attainment Status**	**ppmv**	**µg/m^3**	**Attainment Status**
Ozone (O_3)	1-hour	0.09	177	Nonattainment	--	--	--
	8-hour	0.07	137	Nonattainment	0.075	147	Nonattainment
Nitrogen Dioxide (NO_2)	1-hour	0.18	338	Attainment	--	--	--
	Annual	0.03	56	Attainment	0.053	100	Attainment
Sulfur Dioxide (SO_2)	1-hour	0.25	655	Attainment	--	--	--
	3-hour (secondary)	--	--	--	0.50	1,309	Attainment
	24-hour	0.04	105	Attainment	0.14	367	Attainment
	Annual	--	--	--	0.03	79	Attainment
Carbon Monoxide (CO)	1-hour	20	22,898	Attainment	35	40,071	Attainment
	8-hour	9	10,304	Attainment	9	10,304	Attainment
	Lake Tahoe (8-hr)	6	6,869	Attainment	--	--	--
Particulates (as PM_{10})	24-hour	--	50	Nonattainment	--	150	Unclassified
	Annual	--	20	Nonattainment	--	--	--
Particulates (as $PM_{2.5}$)	24-hour	--	--	--	--	35	Unclassified
	Annual	--	12	Attainment	--	15	Attainment
Lead (Pb)	30-day	--	1.5	Attainment	--	--	--
	90-day	--	--	--	--	1.5	Attainment
Sulfates (as SO_4)	24-hour	--	25	Attainment	none	none	--
Hydrogen Sulfide (H_2S)	1-hour	0.03	42	Unclassified	none	none	--
Vinyl Chloride (C_2H_3Cl)	24-hour	0.01	26	Attainment	none	none	--
Visibility Reducing Particles	8-hour	Extinction coefficient of 0.23 per km; visibility of 10 miles or more (0.07 to 30 miles or more for Lake Tahoe) due to particles when relative humidity is less than 70%.		Unclassified	none	none	--

Source: *California Air Resources Board, June 2008 (CARB 2008a)*

Notes: *Standard Temperature = 25 deg C*
Standard Molar Volume = 24.465 liter/g-mole
For gases, µg/m^3 calculated from ppmv based on molecular weight and standard conditions
ppmv = parts per million by volume
µg/m^3 = micrograms per cubic meter

Ambient Air Quality

The BAAQMD operates a five-zone regional air monitoring network comprising 30 monitoring stations that collectively measure the ambient concentrations of six criteria air pollutants:

- Ozone (O_3)
- Nitrogen Dioxide (NO_2)
- Sulfur Dioxide (SO_2)
- Carbon Monoxide (CO)
- Respirable Particulates (PM_{10})
- Fine Particulates ($PM_{2.5}$)

For this assessment, data from the San Francisco monitoring station is used as historic and representative of the Coast and Central Bay Zone, which includes the Oakland area. Existing and probable future air quality in the Project area can generally be inferred from ambient air quality measurements taken at this site. **Table 3.7-3** is a six-year summary of monitoring data (2002–2007) obtained by the San Francisco station. An Oakland site was opened on November 1, 2007, and a Berkeley site was opened on December 13, 2007. Since there is only a brief period of data available for these sites in 2007, summary reporting will not begin until 2008. (BAAQMD 2008a)

TABLE 3.7-3
Ambient Air Quality Summary for San Francisco 2002-07, Maximums

Pollutant	Period	Units	2007	2006	2005	2004	2003	2002
Ozone (O_3)	1-hour max	ppmv	0.060	0.053	0.058	0.090	0.090	0.050
	8-hour max	ppmv	0.049	0.046	0.054	0.060	0.060	0.050
	3-year avg	ppmv	0.045	0.045	0.048	0.047	0.048	0.044
Nitrogen Dioxide (NO_2)	1-hour max	ppmv	0.069	0.107	0.066	0.060	0.070	0.080
	Annual avg	ppmv	0.016	0.016	0.016	0.017	0.018	0.019
Sulfur Dioxide (SO_2)	24-hour max	ppmv	0.006	0.006	0.007	0.008	0.007	0.006
	Annual avg	ppmv	0.002	0.001	0.001	0.001	0.002	0.002
Carbon Monoxide (CO)	1-hour max	ppmv	2.5	2.7	2.5	2.9	3.6	3.5
	8-hour max	ppmv	1.6	2.1	2.1	2.2	2.8	2.6
Particulates (as PM_{10})	24-hour max	ug/m_3	70.0	61.0	46.0	52.0	52.0	74.0
	Annual avg	ug/m_3	21.9	22.9	20.1	22.5	22.7	24.7
Particulates (as $PM_{2.5}$)	24-hour max	ug/m_3	45.2	54.3	43.6	46.0	42.0	70.0
	Annual avg	ug/m_3	8.7	9.7	9.5	9.9	10.1	13.1

Source: BAAQMD 2008a

Notes *ppmv = parts per million by volume*
$\mu g/m^3$ = micrograms per cubic meter

During the period 2002–2007, there were no daily violations of state or federal ambient air quality standards for ozone, nitrogen dioxide, sulfur dioxide, or carbon monoxide recorded at the San Francisco station (BAAQMD 2008a), however, there were exceedences of PM_{10} and $PM_{2.5}$ standards. **Table 3.7-4** shows the incidence of daily violations of ambient PM_{10} and $PM_{2.5}$ standards for the period.

TABLE 3.7-4
PM_{10} and $PM_{2.5}$ Standard Violation Days for San Francisco 2002-07

Pollutant	Standard	Total	2007	2006	2005	2004	2003	2002
Particulates (as PM_{10})	Federal	0	0	0	0	0	0	0
	California	9	2	3	0	1	1	2
Particulates (as $PM_{2.5}$)	Federal	12	5	3	0	0	0	4
	California	0	0	0	0	0	0	0

Source: BAAQMD 2008a

Source Specific Regulations

Non-road Engine Standards

CARB regulates mobile sources of air pollution in the State of California. In 1992, CARB approved Tier 1 standards exclusively for off-road diesel engines above 175 horsepower. USEPA regulates emission standards for new farm and construction engines operating at less than 175 horsepower. Tier 2 and Tier 3 standards were adopted in 2000 and selectively apply to the full range of diesel off-road engine power categories. Tier 2 standards were originally intended to be equivalent in stringency to the 1991 on-road heavy-duty diesel engine standards and are based on the emission control technologies used by those engines. They were scheduled to be completely phased-in by 2006. Tier 3 standards further reduce emissions of nitrogen oxides, reactive organic compounds, and diesel particulate matter and are scheduled to be completely phased-in by 2008. Both Tier 2 and Tier 3 standards include durability requirements to ensure compliance with the standards throughout the useful life of the engine.

Portable Equipment Registration Program (PERP)

The statewide PERP establishes a uniform program to regulate portable engines and portable engine-driven equipment units. Once registered in PERP, engines and equipment units may operate throughout the State of California without the need to obtain individual permits from local air districts. Owners or operators of portable engines and certain types of equipment can register their units under the PERP in order to operate their equipment anywhere in the state.

Air Toxics Control Measures

On July 26, 2007, CARB adopted a regulation to reduce diesel particulate matter and nitrogen oxide emissions from in use (existing) off-road heavy-duty diesel vehicles in California. Such vehicles are used in construction, mining, and industrial operations. The Air Toxics Control Measures regulation supplements existing tiered emission standards for non-road diesel engines in California.

Senate Bill 656

Senate Bill 656 is a planning requirement that calls for a plan and strategy for reducing $PM_{2.5}$ and PM_{10}. This bill requires CARB to identify, develop, and adopt a list of control measures to reduce the emissions of $PM_{2.5}$ and PM_{10} from new and existing stationary, mobile, and area sources. The BAAQMD has developed particulate matter control measures and submitted a plan to CARB that includes a list of measures to reduce particulate matter. Under the plan, the BAAQMD is required to continue to assess $PM_{2.5}$ and PM_{10} emissions and their impacts. For construction emissions of fugitive PM_{10}, BAAQMD had adopted a number of feasible control measures that can be reasonably implemented to significantly reduce fugitive PM_{10} emissions from construction. BAAQMD's approach to CEQA analyses of construction impacts is to emphasize implementation of effective and comprehensive control measures rather than detailed quantification of emissions.

Nuisance (Odors)

The BAAQMD and CEQA Guidelines require an assessment of the potential for a proposed Project to cause a public nuisance by subjecting surrounding land uses (receptors) to objectionable odors. BAAQMD Regulation 1, Rule 301 states that "No person shall discharge from any source whatsoever such quantities of air contaminants or other material which cause injury, detriment, nuisance or annoyance to any considerable number of persons or the public; or which endangers the comfort, repose, health or safety of any such persons or the public, or which causes, or has a natural tendency to cause, injury or damage to business or property" (BAAQMD 2006).

Toxic Air Contaminants

A project with the potential to expose sensitive receptors (including residential areas) or the general public to substantial levels of toxic air contaminants, as designated by CARB under 17 CCR Section 93001, listed in the BAAQMD 2003 Annual Report Appendix A: Toxic Air Contaminants (BAAQMD 2003), would be deemed to have a significant impact. This includes projects that would locate receptors near existing sources of toxic air contaminants, as well as projects that would place sources of toxic air contaminants near existing receptors.

3.7.3 Impacts and Mitigation Measures

Significance Criteria

The significance criteria for this analysis of the Estates Reservoir Replacement Project were developed from criteria presented in the CEQA Guidelines Appendix G. The proposed Project would result in a significant impact on air quality if it would:

- Conflict with or obstruct implementation of the applicable air quality plan;
- Violate any air quality standard or contribute substantially to an existing or projected air quality violation;
- Result in a cumulatively considerable net increase of any criteria pollutant for which the Project region is in non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors);
- Expose sensitive receptors to substantial pollutant concentrations; or
- Create objectionable odors affecting a substantial number of people.

Pursuant to nonattainment status, the BAAQMD CEQA significance criteria for ozone precursors (NOX and ROC) and PM_{10} emitted from Project operations are shown in **Table 3.7-5**. For CO emissions, significance is defined as causing a violation of the state standard for CO of 9 ppm averaged over 8 hours or 20 ppm for 1 hour (BAAQMD 1999).

TABLE 3.7-5
BAAQMD CEQA Thresholds of Significance

	Total Project	
Significance Criteria	**tons/yr**	**lb/day**
Oxides of Nitrogen (as NO_2)	15	80
Hydrocarbons (ROC as CH_4)	15	80
Particulates (as PM_{10})	15	80

Source: BAAQMD CEQA Guidelines, Table 3 (BAAQMD 1999)

Since the San Francisco Bay Area Air Basin is designated as nonattainment for PM_{10}, large construction projects have the potential to locally increase PM_{10} concentrations from fugitive dust emissions and thus slow or impede efforts to attain state and federal PM_{10} standards. For construction project fugitive dust impacts, BAAQMD policy is to evaluate significance based on a consideration of the control measures to be implemented (BAAQMD 1999). If appropriate mitigation measures are implemented to control fugitive dust PM_{10} emissions, construction-related air quality impacts on local PM_{10} levels would be deemed less than significant.

Impacts and Mitigation Measures

The air quality impact analysis considers construction impacts associated with the proposed Project. Construction emissions are evaluated in accordance with the Bay Area Air Quality Management District CEQA Guidelines (BAAQMD 1999). Minimal operational emissions would be associated with the proposed Estates Reservoir Replacement Project storage tanks and landscaped areas; therefore, no operational impact analysis is required. Ongoing maintenance of Project facilities and landscaping at the site would be at levels similar to existing conditions.

Impact 3.7-1: The Project would not conflict with or obstruct any air quality plans of the BAAQMD, specifically, the BAAQMD Clean Air Plan and Ozone Attainment Plan (BAAQMD 2000).

General estimated basin-wide construction-related emissions are included in the BAAQMD emission inventory (which, in part, forms the basis for the air quality plans cited above) and are not expected to prevent attainment or maintenance of the ozone, particulate matter, and carbon monoxide standards within the Bay Area. Therefore, construction impacts related to air quality plans for these pollutants from the proposed Project would be less than significant, and no mitigation would be required, since they are presently estimated and accounted for in the emission inventory.

Mitigation Measure: None Required.

Impact 3.7-2: The Project would have the potential to contribute to the already existing violation of air quality standards in the Project vicinity for PM_{10} and $PM_{2.5}$, primarily through fugitive dust emissions of PM_{10} during demolition and construction, and from PM_{10} and $PM_{2.5}$ emissions from diesel-powered construction equipment.

As shown in **Table 3.7-5**, the significance criteria in the BAAQMD CEQA Guidelines for Project operations are 80 pounds per day oxides of nitrogen, hydrocarbons, and/or particulate matter as PM_{10} or 15 tons per year nitrogen, hydrocarbons, and/or PM_{10} (BAAQMD 1999). There would be temporary and transient construction emissions. Therefore, a preliminary screening impact analysis has been performed based on the planned implementation of the proposed Project. Estimated controlled[17] on-site emissions from demolition and construction activities are summarized in **Table 3.7-6**. Detailed calculation and modeling templates are in the Air Quality Technical Report (ENTRIX 2009), and are based on conservative assumptions for equipment usage.

[17] "Controlled" means implementation of BAAQMD required emissions control measures.

Table 3.7-6
Estimated On-site and Off-site Total Criteria & GHG* Emissions - Controlled

	Demolition Phase		Construction Phase		Total Project	
Project Emissions	**tons**	**lbs/day**	**tons**	**lbs/day**	**tons**	**lbs/day**
Oxides of Nitrogen (as NO_2)	2.1	151	7.7	164	9.8	164
Hydrocarbons (ROC as CH_4)	0.2	16	0.8	18	1.1	18
Carbon Monoxide (CO)	1.3	92	4.6	97	5.8	97
Particulates (as PM_{10})	0.1	10	0.5	10	0.6	10
Sulfur Dioxide (SO_2)	0.00	0.14	0.01	0.13	0.01	0.14
Diesel Particulate Matter (DPM)	0.1	9.3	0.5	10.2	0.6	10.2
Fugitive Dust (as PM_{10})	0.5	9.4	1.3	8.3	1.8	9.4

Note: Greenhouse gas emissions are assessed for impacts in Section 3.8 of the EIR

Since daily emissions of NO_X are over the BAAQMD level of significance, and PM_{10} and $PM_{2.5}$ are in nonattainment, screening dispersion modeling was performed to determine whether state or federal ambient air quality standards would be exceeded solely due to Project activities against historic maximum background levels. The screening air quality impacts are shown in **Table 3.7-7** and **Table 3.7-8**, where demolition has the highest mitigated fugitive dust emission rate while construction has the highest mitigated NO_X and diesel particulate matter emission rate. A screening risk evaluation for diesel particulate matter for the longer construction period is shown in **Table 3.7-9**.

TABLE 3.7-7
Estimated Demolition Phase Criteria Maximum Impacts - Controlled
(Demolition Phase)

					California Standard		Federal Standard	
Criteria Pollutant	**Averaging Period**	**Modeled µg/m³**	**Back-ground µg/m³**	**Total µg/m³**	**µg/m³**	**status**	**µg/m³**	**status**
Nitrogen Dioxide (NO_2)	1-hour max	11.5	201	212	338	Under	---	Under
	Annual avg	0.3	36	36	56	Under	100	Under
Sulfur Dioxide (SO_2)	1-hour max	0.1	52	52	655	Under	---	Under
	3-hour	0.1	47	47	---	Under	1309	Under
	24-hour	0.0	21	21	105	Under	367	Under
	Annual avg	0.0	6	6	---	Under	79	Under
Carbon Monoxide (CO)	1-hour max	48.6	4,120	4,169	22,898	Under	40,071	Under
	8-hour	34.1	3,205	3,239	10,304	Under	10,304	Under
Particulates (as PM_{10})	24-hour	0.60	74.0	74.6	50	Exceed	150	Under
	Annual avg	0.11	24.7	24.8	20	Exceed	---	Under
Particulates (as $PM_{2.5}$)	24-hour	0.59	70.0	70.6	---	Under	35	Exceed
	Annual avg	0.11	13.1	13.2	12	Exceed	15	Under
Fugitive Dust (as PM_{10})	24-hour	5.06	74.0	79.1	50	Exceed	150	Under
	Annual avg	0.95	24.7	25.7	20	Exceed	---	Under

Source: Background reference is San Francisco 2002-07
Notes: µg/m3 = micrograms per cubic meter
Combustion emissions maximum impact at 225 m (738 ft), point or volume source
Fugitive dust maximum impact at 85 m (279 ft), area source

TABLE 3.7-8
Estimated Construction Phase Criteria Maximum Impacts - Controlled
(Construction Phase)

Criteria Pollutant	Averaging Period	Modeled µg/m^3	Back-ground µg/m^3	Total µg/m^3	California Standard µg/m^3	California Standard status	Federal Standard µg/m^3	Federal Standard status
Nitrogen Dioxide (NO_2)	1-hour max	10.7	201	212211	338	Under	---	Under
	Annual avg	0.7	36	37	56	Under	100	Under
Sulfur Dioxide (SO_2)	1-hour max	0.1	52	52	655	Under	---	Under
	3-hour	0.1	47	47	---	Under	1309	Under
	24-hour	0.0	21	21	105	Under	367	Under
	Annual avg	0.0	6	6	---	Under	79	Under
Carbon Monoxide (CO)	1-hour max	45.2	4,120	4,165	22,898	Under	40,071	Under
	8-hour	31.7	3,205	3,237	10,304	Under	10,304	Under
Particulates (as PM_{10})	24-hour	0.56	74.0	74.6	50	Exceed	150	Under
	Annual avg	0.32	24.7	25.0	20	Exceed	---	Under
Particulates (as $PM_{2.5}$)	24-hour	0.55	70.0	70.6	---	Under	35	Exceed
	Annual avg	0.32	13.1	13.4	12	Exceed	15	Under
Fugitive Dust (as PM_{10})	24-hour	5.06	74.0	79.1	50	Exceed	150	Under
	Annual avg	2.95	24.7	27.6	20	Exceed	---	Under

Source: Background reference is San Francisco 2002-07
Notes: µg/m3 = micrograms per cubic meter
Combustion emissions maximum impact at 256 m (840 ft), point or volume source
Fugitive dust maximum impact at 85 m (279 ft), area source

TABLE 3.7-9
Diesel Particulate Matter Screening Health Risk Assessment

Pollutant	Annual µg/m^3	URV (µg/m^3)	Activity days	Annual MEI Correction	Cancer Risk
Diesel Particulate Matter (DPM)	0.32	3.00E-04	310	0.0121	1.2E-06

Source: California Environmental Protection Agency, Office of Environmental Health Hazard Assessment, 2005
Notes: µg/m3 = micrograms per cubic meter
URV = Unit Reference Value

The results of the screening analysis for criteria pollutants show that no exceedence of ambient air quality standards in the Project vicinity would result solely from Project activities, a less than significant impact. Notwithstanding Project-generated impacts, maximum background levels of particulate matter (PM_{10}, $PM_{2.5}$) already exceed state or federal standards as applicable in the Project vicinity. Therefore, the Project would incrementally contribute to these existing exceedences. The BAAQMD has developed emission control measures for construction emissions that, when implemented, reduce the impacts to less than significant. Also, the results of the screening risk assessment show that the probability of contracting cancer from diesel particulate matter, for the Maximally

Exposed Individual during the construction phase is about 1.2×10^{-6}, which is less than the 10 in 1 million (10^{-5}) BAAQMD CEQA threshold**.**

Mitigation Measure: None Required.

Measure 3.7-2a: The following diesel control measures will be incorporated by EBMUD into contract specifications:

- To minimize potential diesel odor impacts on nearby receptors (pursuant to BAAQMD Regulation 1, Rule 301, Nuisance), construction equipment will be properly tuned. A schedule of tune-ups will be developed and performed for all equipment operating within the Project area, particularly for haul and delivery trucks. A log of required tune-ups will be maintained and a copy of the log will be submitted to EBMUD for review every 2,000 service hours.
- Fixed temporary sources of air emissions (such as portable pumps, compressors, generators, etc.) will be electrically powered unless the contractor submits documentation and receives approval from EBMUD that the use of such equipment is not practical, feasible, or available (generally contingent upon power line proximity, capacity, and accessibility). California ultra-low sulfur diesel fuel with a maximum sulfur content of 15 ppm by weight, or an approved alternative fuel, will be used for on-site fixed equipment not using line power. If sufficient power line capacity is available, EBMUD will endeavor to rent (via the contractor) an electrically-powered concrete crusher in lieu of a diesel powered unit. This will eliminate emissions associated with combustion of approximately 1,800 gallons of diesel fuel.
- To minimize diesel emission impacts, construction contracts will require off-road compression ignition equipment operators to reduce unnecessary idling with a two (2) minute time limit.
- On-road and off-road material hauling vehicles will shut off engines while queuing for loading and unloading for time periods longer that two (2) minutes.
- Off-road diesel equipment will be fitted with verified diesel emission control systems (e.g., diesel oxidation catalysts) to the extent reasonably and economically feasible.
- Utilize alternative fuel equipment (i.e., compressed or liquefied natural gas, biodiesel, electric) to the extent reasonably and economically feasible.

Significance after Mitigation: Less than Significant.

Measure 3.7-2b: Construction emissions of fugitive PM_{10} can vary greatly depending on the level of activity, the specific operations taking place, the equipment being operated, local soils, weather conditions, and other factors. Despite this variability in emissions, experience has shown that there are a number of feasible control measures that can be reasonably implemented to significantly reduce fugitive PM_{10} emissions from construction. To control emissions of particulate matter, including dust from concrete crushing, the Project shall implement the following fugitive dust and particulate matter emissions control measures suggested by the BAAQMD CEQA Guidelines as applicable (BAAQMD 1999). The estimated effectiveness of these control measures is quantified in **Tables 3.7-10 and 3.7-11**.

Basic Dust Control Measures. The following controls will be implemented at all construction sites:

- Water and/or coarse rock all active construction areas as necessary and indicated by soil and air conditions;
- Cover all trucks hauling soil, sand, and other loose materials or require all trucks to maintain at least two feet of freeboard;
- Pave or apply (non-toxic) soil stabilizers on all unpaved access roads, parking areas and staging areas at construction sites;
- Sweep daily (with water sweepers) all paved access roads, parking areas and staging areas at construction sites;
- Sweep streets daily (with water sweepers) if visible soil material is carried onto adjacent public streets.
- Suspend excavation and grading activity when sustained winds make reasonable dust control difficult to implement, e.g., for winds over 25 miles per hour.
- Limit the area subject to excavation, grading, and other construction activity at any one time, as feasible.

Particulate Matter Emissions Control Measures. In addition, the Project shall implement the following measures to reduce particulate matter emissions from diesel exhaust:

- Grid power shall be used instead of diesel generators where it is feasible to connect to grid power (generally contingent upon power line proximity, capacity, and accessibility);
- The Project specifications shall include 13 CCR Sections 2480 and 2485, which limit the idling of all diesel-fueled commercial vehicles (weighing over 10,000 pounds, both California- or non-California-based trucks) to 30 seconds at a school or 5 minutes at any location. In addition, the use of diesel auxiliary power systems and main engines shall be limited to 5 minutes when within 100 feet of homes or schools while the driver is resting;

- The Project specifications shall include 17 CCR Section 93115, Airborne Toxic Control Measure for Stationary Compression Ignition Engines, which specifies fuel and fuel additive requirements; emission standards for operation of any stationary, diesel-fueled, compression-ignition engines; and operation restrictions within 500 feet of school grounds when school is in session;
- A schedule of low-emissions tune-ups shall be developed and such tune-ups shall be performed on all equipment, particularly for haul and delivery trucks; and
- Low-sulfur (≤ 15 ppmw S) fuels shall be used in all stationary and mobile equipment.

TABLE 3.7-10
Estimated Fugitive Dust Emissions from Demolition

Demolition Phase	Area Acres	Schedule Days	Control Percent	Uncontrolled		Controlled	
				lbs/day	lbs/yr	lbs/day	lbs/yr
Reservoir Area	2.25	100	95%	140	14,050	7.0	702
Access Road	0.50	125	95%	26	3,188	1.3	159
Building Demolition (cu ft vol)	1,090,000	100	75%	5	458	1.1	114
Totals				171	17,695	9.4	976

Source: BAAQMD Ref: AP-42 Chapter 13.2.3 "Heavy Construction Operations"
Fugitive dust (as PM_{10}) 0.00042 lb/cu ft of building volume unmitigated, BAAQMD CEQA Guidelines, Section 3.3
Fugitive dust (as PM_{10}) 51 lb/acre-day unmitigated, BAAQMD CEQA Guidelines, Section 3.3
Mitigation Ref. AP-42 Chapter 13.2.3 "Heavy Construction Operations," Table 13.2.3-2 Wet suppression
Mitigation Ref: AP-42 Chapter 13.2.2 "Unpaved Roads," Figure 13.2.2-2

Note: Soil moisture ratio = 5 (for all feasible mitigation measures)

TABLE 3.7-11
Estimated Fugitive Dust Emissions from Construction

Construction Phase	Area Acres	Schedule Days	Control Percent	Uncontrolled		Controlled	
				lbs/day	lbs/yr	lbs/day	lbs/yr
Reservoir Area	2.25	310	95%	140	43,554	7.0	2,178
Access Road	0.50	340	95%	26	8,670	1.3	434
Totals				166	52,224	8.3	2,611

Source: BAAQMD Ref: AP-42 Chapter 13.2.3 "Heavy Construction Operations"
Fugitive dust (as PM_{10}) 0.00042 lb/cu ft of building volume unmitigated, BAAQMD CEQA Guidelines, Section 3.3
Fugitive dust (as PM_{10}) 51 lb/acre-day unmitigated, BAAQMD CEQA Guidelines, Section 3.3
Mitigation Ref. AP-42 Chapter 13.2.3 "Heavy Construction Operations," Table 13.2.3-2 Wet suppression
Mitigation Ref: AP-42 Chapter 13.2.2 "Unpaved Roads," Figure 13.2.2-2

Note: Soil moisture ratio = 5 (for all feasible mitigation measures)

Because these control measures will be implemented, fugitive dust and particulate matter emissions are reduced substantially, and the impact is less than significant.

Significance after Mitigation: Less than Significant.

Impact 3.7-3: The proposed Project would result in an incremental contribution to a cumulative effect for several criteria pollutants for which the San Francisco Bay region is in nonattainment under an applicable federal or state ambient air quality standard.

As detailed in this discussion for Impact 3.7-1, the San Francisco Bay Area Air Basin is in nonattainment of state and federal ozone, PM_{10}, and $PM_{2.5}$ standards for several different averaging times. As detailed in this discussion for Impact 3.7-2, the on-site operation of heavy equipment during demolition and construction would generate combustion emissions and fugitive dust emissions, resulting in a short-term incremental impact. Off-site vehicle emissions (trucks and worker vehicles) would also contribute to a short-term incremental impact in the San Francisco Bay Area Air Basin.

These incremental impacts were determined to be less than significant because EBMUD shall implement the applicable fugitive dust and particulate matter emissions control measures contained in the BAAQMD CEQA Guidelines (BAAQMD 1999) and listed under Impact 3.7-2. The use of newer, less polluting Tier 1, 2, and 3 engines in the majority of construction equipment used on-site is a measure for reducing combustion emissions of NOX, ROC, CO, PM_{10}, and $PM_{2.5}$. Although not a mitigation measure per se, California ultra-low sulfur diesel fuel with a maximum sulfur content of 15 ppm by weight will be used in all diesel-powered equipment which minimizes sulfur dioxide and particulate emissions. The results of the screening analysis for criteria pollutants presented previously show that no exceedence of ambient air quality standards in the Project vicinity would result solely from Project activities.

These small incremental impacts are not cumulatively considerable because EBMUD would comply with specific requirements in the BAAQMD's approved air quality plans for attainment of ozone and particulate matter. In short, these regional plans address the existing and cumulative impact problems.

Significance after Mitigation: Less than Significant.

Impact 3.7-4: The proposed Project would not expose sensitive receptors to substantial pollutant concentrations.

The Project site is located in a hillside residential area. Residential uses surrounding the Project site consist of single-family dwellings on Estates Drive, Bullard Drive, Wood Drive, Wood Court, McAndrew Drive, Moyer Place, LaSalle Avenue, Bruns Court, Harbord Drive, Johnston Drive, and other streets in the neighborhood. It is not known whether some residences in the immediate vicinity (i.e., 1,000 feet or 305 meters) of the Project site might house potentially sensitive persons, but it is probable based on the demographics of persons commenting at public meetings held on Project alternatives.

There would be no emissions from long-term storage tank operations to affect sensitive receptors, and minimal emissions from landscape and facilities maintenance. However, as discussed under Impact 3.7-2, demolition and construction activities would cause short-term emissions of NOX, ROC, CO, SO_2, PM_{10}, and $PM_{2.5}$ from diesel-powered equipment and earthmoving (ground disturbance). The results of the screening analysis contained in the analysis for criteria pollutants show that no exceedence of ambient air quality standards in the Project vicinity would result solely from Project activities. Notwithstanding Project-generated impacts, maximum background levels of particulate matter (PM_{10}, $PM_{2.5}$) already exceed state or federal standards as applicable in the Project vicinity.

Diesel particulate matter (DPM) contain substances that are suspected carcinogens, along with pulmonary irritants and hazardous compounds which may affect sensitive receptors such as young children, senior citizens, or those susceptible to respiratory disease. Where construction activity occurs in proximity to long-term sensitive receptors, there could be a potential for unhealthful exposure of those receptors to diesel exhaust, including residential receptors. The results of the screening risk assessment contained in Impact 3.7-2, analyses show that the probability of contracting cancer from diesel particulate matter, for the Maximally Exposed Individual during the construction phase is about 1.2×10^{-6}, which is less than the 10 in one million (1×10^{-5}) BAAQMD CEQA threshold and thus not significant.

Construction emissions are transient and temporary in nature, and BAAQMD control measures would be implemented as described previously. Impacts on sensitive receptors are anticipated to be less than significant, and no further mitigation would be required.

Significance after Mitigation: Less than Significant.

Impact 3.7-5: The proposed Project would not create objectionable odors affecting a substantial number of people.

California ultra-low sulfur diesel fuel with a maximum sulfur content of 15 ppm by weight will be used in all diesel-powered equipment which minimizes emissions of sulfurous gases (sulfur dioxide, hydrogen sulfide, carbon disulfide, and carbonyl sulfide). Therefore, no objectionable odors are anticipated from demolition or construction activities or normal operation of the Project. The proposed Project would have no significant impact, and no mitigation would be required.

Mitigation Measure: None Required.

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3.8 Greenhouse Gases

3.8-1 Approach to Analysis

This section of the Estates Reservoir Replacement Draft EIR is based on the Greenhouse Gases and Climate Change Technical Report (ENTRIX 2009).

The climate change impact analysis considers maximum construction impacts associated with the proposed Project. Construction emissions are evaluated in accordance with The Climate Registry General Reporting Protocol, Version 1.1 (TCR 2008). There would be no new or increased operations emissions associated with the proposed Project; therefore, no operational impact analysis is required. Ongoing maintenance of facilities and landscaping at the site would be at levels similar to existing conditions.

State law defines greenhouse gases (GHG) to include the following: carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons (HFCs), perfluorocarbons, and sulfur hexafluoride (Health and Safety Code, Section 38505(g).) The most common GHG that results from human activity is carbon dioxide, followed by methane and nitrous oxide. (OPR 2008)

Project construction GHG emissions fall into three general categories: 1) direct on-site use of diesel-powered construction equipment (including generators), 2) direct off-site vehicle traffic comprising Project -related trucking and Project worker commuting, and 3) on-site use of electric power provided by the grid (i.e., indirect emissions from mixed electric power generation). Construction-related emissions are generally short-term in duration, but may still contribute to global climate change.

Long-term increases or reductions in use of electric power cause corresponding changes in fuel based electric power generation (i.e., coal, natural gas, biomass/waste) with proportional increases or decreases of indirect GHG emissions from these sources. Using The Climate Registry General Reporting Protocol, Version 1.1, Chapter 14, these GHG emissions were estimated as part of the assessment. (TCR 2008)

The analysis of the Project's global climate impacts is based on equipment specifications and planning estimates for the demolition and construction phases. These specifications and estimates are listed in the Greenhouse Gases and Climate Change Technical Report (ENTRIX 2009).

On-site Equipment Emissions

Table 3.8-1 shows estimated maximum fuel consumption for the Project based on equipment specifications and planning estimates for the demolition and construction phases provided by EBMUD, assuming a diesel default heat rate of 7,000 BTU/ BHP -hour and a higher heating value of 19,300 BTU/pound or 137,030 BTU/gallon (AP-42, Table 3.3-1) (USEPA 2006). Actual fuel consumption would likely be less, with

correspondingly lower emissions. Fuel consumption is the basis for determining diesel exhaust emissions in this section as well as Section 3.7, Air Quality.

Off-site Vehicle Emissions

A relatively small source of GHG emissions compared to on-site equipment, off-site vehicle emissions comprise worker commute trips in light-duty vehicles (passenger cars and light trucks) to and from the Project site, and heavy-duty truck emissions generally associated with hauling away debris and transporting materials and equipment to the site. Commuter trip estimates developed by EBMUD were used as the basis, using the emissions estimation methodology given in the BAAQMD CEQA Guidelines Section 3.4, Table 9. Similarly, heavy-duty truck trip estimates developed by EBMUD were translated into emissions utilizing CARB's EMFAC 2007 computer program (i.e., determination of emission factors), along with light-duty gasoline vehicles. GHG from vehicle use were estimated following the protocol given in Table A-99, Annex 3 of the Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2006. (EPA 2008)

TABLE 3.8-1
Estimated Maximum Fuel Consumption for Project

Project Activity	Hourly gal/hr	Daily gal/day	Project gallons
Demolition Phase	90	530	15,000
Construction Phase	110	580	55,000
Project Total			**70,000**

Sources: BSFC = (7,000 BTU/BHP-hr) / (137,030 BTU/gal) = 0.051 gal/BHP-hr
AP-42 Table 3.3-1 EBMUD 2009

3.8.2 Setting/Regulatory Framework

The environmental setting for GHG emissions and climate change is larger than the immediate Project area. The sections below describe the context for climate change as being the Earth and the properties of GHGs to affect global climate change.

Overview of Climate Change

Under the United Nations Framework Convention on Climate Change (UNFCCC), the definition of climate change is "a change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time periods" (USEPA 2008).

Properties of the Earth's Atmosphere

Table 3.8-2 shows the typical composition of dry standard air (UIG 2008, USEPA 2008). The apparent molecular weight of dry standard air is 28.966 (Jennings 1970, du Pont 1971).

TABLE 3.8-2
Standard Composition of Dry Air

Principal Gas	Chemical Symbol	MW g/mole	Concentration ppmv	Mole fraction	Fraction percent	MW g/mole
Nitrogen	N_2	28.014	780,805.00	0.78080500	78.080500	21.873471
Oxygen	O_2	31.998	209,450.00	0.20945000	20.945000	6.701981
Argon	Ar	39.948	9,340.00	0.00934000	0.934000	0.373114
Carbon Dioxide	CO_2	44.009	377.76	0.00037776	0.037776	0.016625
Neon	Ne	20.183	18.21	0.00001821	0.001821	0.000368
Helium	He	4.003	5.24	0.00000524	0.000524	0.000021
Methane	CH_4	16.043	1.75	0.00000175	0.000175	0.000028
Krypton	Kr	83.800	1.14	0.00000114	0.000114	0.000096
Hydrogen	H_2	2.016	0.50	0.00000050	0.000050	0.000001
Nitrous Oxide	N_2O	44.013	0.31	0.00000031	0.000031	0.000014
Xenon	Xe	31.300	0.09	0.00000009	0.000009	0.000003
Totals			**1,000,000.00**	**1.00000000**	**100.000000**	**28.966**

Source: *Universal Industrial Gases, Inc., http://www.uigi.com/air.html, 2008.*
USEPA 2008
Condensed Laboratory Handbook, E.I. du Pont de Nemours & Co., Inc., Wilmington, DE, 1971
Environmental Engineering – Analysis and Practice, B. H. Jennings, International Textbook Company, 1970

Notes: *MW = molecular weight, g/mole*
ppmv = parts per million by volume (10-6)
Carbon dioxide varies with uptake by removal mechanisms, 365 (IPCC) to 380 ppmv (UIG)

Properties of Greenhouse Gases

As shown in **Table 3.8-2**, over 99 percent of the Earth's atmosphere consists of nitrogen and oxygen. However, neither plays a significant role in enhancing the greenhouse effect because both are essentially transparent to terrestrial radiation. The greenhouse effect is primarily a function of the concentration of water vapor, carbon dioxide, and other trace gases in the atmosphere that absorb the terrestrial radiation leaving the surface of the Earth (USEPA 2008). Changes in the atmospheric concentrations of these greenhouse gases can alter the balance of energy transfers between the atmosphere, space, land, and the oceans. A gauge of these changes is called radiative forcing, which is a simple measure of changes in the energy available to the Earth-atmosphere system (USEPA 2008).

A brief description of each GHG, its sources, and its role in the atmosphere is given below. The following section then explains the concept of Global Warming Potential (GWP), which are assigned to individual gases as a measure of their relative average global radiative forcing effect.

Water Vapor (H_2O) - The most abundant and dominant greenhouse gas in the atmosphere is water vapor. Water vapor is neither long-lived nor well mixed in the atmosphere, varying spatially from 0 to 2 percent (USEPA 2008). In addition, atmospheric water can exist in several physical states including gaseous, liquid, and solid. Human activities are not believed to directly affect the average global concentration of water vapor; however, the radiative forcing produced by the increased concentrations of other GHG may indirectly affect the hydrologic cycle. A warmer atmosphere has an increased water holding capacity; yet, increased concentrations of water vapor affects the formation of clouds, which can both absorb and reflect solar and terrestrial radiation.

Carbon Dioxide (CO_2) - In nature, carbon is cycled between various atmospheric, oceanic, land biotic, marine biotic, and mineral reservoirs. Atmospheric CO_2 is part of this global carbon cycle. Carbon dioxide concentrations in the atmosphere increased from 278 parts per million by volume (ppmv) in pre-industrial times to 365 ppmv in 1998, a 31 percent increase (USEPA 2008). The Intergovernmental Panel on Climate Change (IPCC), notes that "this concentration has not been exceeded during the past 420,000 years, and likely not during the past 20 million years. The rate of increase over the past century is unprecedented, at least during the past 20,000 years." The IPCC definitively states that "the present atmospheric CO_2 increase is caused by anthropogenic emissions of CO_2" (USEPA 2008).

Methane (CH_4) - Methane is primarily produced through anaerobic decomposition of organic matter in biological systems. Agricultural processes such as wetland rice cultivation, enteric fermentation in animals, and the decomposition of animal wastes emit methane, as does the decomposition of municipal solid wastes. Methane is also emitted during the production and distribution of natural gas and petroleum, and is released as a by-product of coal mining and incomplete fossil fuel combustion. Atmospheric concentrations of methane have increased by about 150 percent since pre-industrial times, although the rate of increase has been declining. The IPCC has estimated that slightly more than half of the current methane flux to the atmosphere is anthropogenic from human activities such as agriculture, fossil fuel use and waste disposal (USEPA 2008).

Nitrous Oxide (N_2O) - Anthropogenic sources of N_2O emissions include agricultural soils, especially the use of synthetic and manure fertilizers; fossil fuel combustion, especially from mobile combustion; adipic (nylon) and nitric acid production; wastewater treatment and waste combustion; and biomass burning. The atmospheric concentration of N_2O has increased by 16 percent since 1750, from a pre-industrial value of about 270 ppb to 314 ppb in 1998, a concentration that has not been exceeded during the last thousand years (USEPA 2008).

Ozone (O_3) - Ozone is present in both the upper stratosphere, where it shields the Earth from harmful levels of ultraviolet radiation, and at lower concentrations in the troposphere, where it is the main component of anthropogenic photochemical "smog." During the last two decades, emissions of anthropogenic chlorine and bromine-containing halocarbons, such as chlorofluorocarbons (CFCs), have depleted stratospheric ozone concentrations. This loss of ozone in the stratosphere has resulted

in negative radiative forcing. The depletion of stratospheric ozone and its radiative forcing was expected to reach a maximum in about 2000 before starting to recover, with detection of such recovery not expected to occur much before 2010. The past increase in tropospheric ozone, which is also a GHG, is estimated to provide the third largest increase in direct radiative forcing since the pre-industrial era, behind CO_2 and CH_4. (USEPA 2008)

Halocarbons, Perfluorocarbons, and Sulfur Hexafluoride (SF_6) - Halocarbons are, for the most part, man-made chemicals that have both direct and indirect radiative forcing effects. Halocarbons that contain chlorine—CFCs, hydrochlorofluorocarbons (HCFCs), methyl chloroform, and carbon tetrachloride—and bromine—halons, methyl bromide, and hydrobromofluorocarbons (HBFCs)—result in stratospheric ozone depletion. Although CFCs and HCFCs include potent global warming gases, their net radiative forcing effect on the atmosphere is reduced because they cause stratospheric ozone depletion, which is itself an important GHG in addition to shielding the Earth from harmful levels of ultraviolet radiation. (USEPA 2008)

Carbon Monoxide (CO) - Carbon monoxide has an indirect radiative forcing effect by elevating concentrations of methane and tropospheric ozone. Carbon monoxide is created when carbon containing fuels are burned incompletely. (USEPA 2008)

Nitrogen Oxides (NO_x) - The primary climate change effects of nitrogen oxides (i.e., NO and NO_2) are indirect and result from their role in promoting the formation of ozone in the troposphere and, to a lesser degree, lower stratosphere, where it has positive radiative forcing effects. Nitrogen oxides are created from lightning, soil microbial activity, biomass burning – both natural and anthropogenic fires – fuel combustion, and, in the stratosphere, from the photo-degradation of N_2O). (USEPA 2008)

Nonmethane Volatile Organic Compounds (NMVOC) - Nonmethane volatile organic compounds (also referred to as VOC) include compounds such as ethane (C_2H_4), propane (C_3H_8), butane (C_4H_{10}), and pentane (C_5H_{12}). These compounds participate, along with NO_X, in the formation of tropospheric ozone and other photochemical oxidants. NMVOCs are emitted primarily from transportation and industrial processes, as well as biomass burning and non-industrial consumption of organic solvents. (USEPA 2008)

Aerosols - Aerosols are extremely small particles or liquid droplets found in the atmosphere. They can be produced by natural events such as dust storms and volcanic activity, or by anthropogenic processes such as fuel combustion and biomass burning. Aerosols are removed from the atmosphere relatively rapidly by precipitation. (USEPA 2008)

Various categories of aerosols exist, including naturally produced aerosols such as soil dust, sea salt, and anthropogenically manufactured aerosols such as industrial dust and carbonaceous aerosols from transportation, coal combustion, cement manufacturing, waste incineration, and biomass burning. The net effect of aerosols is believed to produce a negative radiative forcing effect.

Current research suggests that another constituent of aerosols, elemental carbon, may have a positive radiative forcing. The primary anthropogenic emission sources of elemental carbon include diesel exhaust, coal combustion, and biomass burning.

Global Warming Potential - GWP is intended as a quantified measure of the globally averaged relative radiative forcing impacts of a particular GHG. It is defined as the cumulative radiative forcing both direct and indirect effects integrated over a period of time from the emission of a unit mass of gas relative to some reference gas (USEPA 2008). Carbon dioxide (CO_2) is the reference gas.

The GWP values shown in **Table 3.8-3** and **Table 3.8-4** allow comparisons of the impacts of emissions and reductions of different gases.

Greenhouse gases with relatively long atmospheric lifetimes (e.g., CO_2, CH_4, N_2O, HFCs, PFCs, and SF_6) tend to be evenly distributed throughout the atmosphere; and, consequently, global average concentrations can be determined. However, it is difficult to quantify global radiative forcing impacts for the short-lived gases such as water vapor, carbon monoxide, tropospheric ozone, other ambient air pollutants and tropospheric aerosols. GWP values are generally not attributed to these gases that are short-lived and spatially inhomogeneous in the atmosphere. (USEPA 2008)

Regulatory Background

Global Warming Solutions Act (AB 32)

The Global Warming Solutions Act of 2006 (AB 32) codifies California's goal of reducing statewide emissions of greenhouse gases to 1990 levels by 2020. This reduction will be accomplished through an enforceable statewide cap on global warming emissions that will be phased in starting in 2012 to achieve maximum technologically feasible and cost-effective GHG emission reductions. In order to effectively implement the cap, AB 32 directs the Air Resources Board (ARB) to develop appropriate regulations and establish a mandatory reporting system to track and monitor global warming emissions levels.

While AB 32 does not amend CEQA to require new analytic processes to account for the environmental impacts of GHG emissions from project subject to CEQA, it does acknowledge that such emissions cause significant adverse impacts to the environment.

TABLE 3.8-3
100-Year Global Warming Potentials of Greenhouse Gases

Greenhouse Gas	Lifetime Years	GWP 100-Year
Carbon Dioxide (CO_2)	50-200	1
Methane (CH_4)	9-15	21
Nitrous Oxide (N_2O)	120	310
HFC-23	264	11,700
HFC-125	33	2,800
HFC-134a	15	1,300
HFC-143a	48	3,800
HFC-152a	2	140
HFC-227ea	37	2,900
HFC-236fa	209	6,300
HFC-4310mee	17	1,300
Fluoromethane (CF_4)	50,000	6,500
Fluoroethane (C_2F_6)	10,000	9,200
Fluorobutane (C_4F_{10})	2,600	7,000
Fluorohexane (C_6F_{14})	3,200	7,400
Sulfur Hexafluoride (SF_6)	3,200	23,900

Source: USEPA 2008

TABLE 3.8-4
100-Year Global Warming Potentials of Ozone Depleters

Ozone Depleter	Direct 100-Year	Net Effect	
		min	max
CFC-11	4,600	(600)	3,600
CFC-12	10,600	7,300	9,900
CFC-113	6,000	2,200	5,200
HCFC-22	1,700	1,400	1,700
HCFC-123	120	20	100
HCFC-124	620	480	590
HCFC-141b	700	(5)	570
HCFC-142b	2,400	1,900	2,300
Trichloromethane ($CHCl_3$)	140	(560)	0
Carbon Tetrachloride (CCl_4)	1,800	(3,900)	660
Methyl Bromide (CH_3Br)	5	(2,600)	(500)
Halon-1211	1,300	(24,000)	(3,600)
Halon-1301	6,900	(76,000)	(9,300)

Source: USEPA 2008

At present, no enforceable rules or regulations have been promulgated by the ARB or other state agency which defines a significant source of GHG emissions. In addition, there are no applicable facility-specific emission limitations or caps for GHG emissions, either statewide or at the local Air Pollution Control District (APCD) or Air Quality Management District (AQMD) level. Thus, there is no present state or local regulatory or guidance mechanism for determining whether a project advances or hinders California's greenhouse gas reduction goals, and no standards of significance for GHG impacts have been established under CEQA. (CAPCOA 2008)

Senate Bill 1368 - California Senate Bill 1368 (SB 1368) adds sections 8340 and 8341 to the Public Utilities Code (effective January 1, 2007) with the intent "to prevent long-term investments in power plants with GHG emissions in excess of those produced by a combined-cycle natural gas power plant" with the aim of "reducing emissions of greenhouse gases from the state's electricity consumption, not just the state's electricity production." The bill provides a mechanism for reducing the GHG emissions of electricity providers, both in-state and out-of-state, thereby assisting the Air Resource Board in meeting its mandate under AB 32, the Global Warming Solutions Act of 2006.

SB 1368 prohibits California utilities (i.e., load serving entities, LSE) from entering into long-term (5 years or longer) power contracts with generators unless base load generation (i.e., 60 percent annual capacity factor or greater) complies with stringent GHG emission standards. In 2007 the California Public Utilities Commission (PUC) established an output-based emission performance standard (EPS) for investor-owned utilities' base load generation. The EPS requires that base load generation GHG emission rates in units of pounds per net megawatt-hour (lb/net MW-hr CO_2 equivalent) cannot exceed that of a new base load combined-cycle natural gas-fired plant. The 2007 interim EPS is 1,100 lb/net MW-hr of CO2 (PUC Decision No. 07-01-039).

Senate Bill 97 - California Senate Bill 97 (SB 97) directs the Office of Planning and Research (OPR) to prepare, develop, and transmit to the Resources Agency CEQA guidelines for the feasible mitigation of GHG emissions or their effects by July 1, 2009. The Resources Agency is required to certify or adopt those guidelines by January 1, 2010. This bill also protects, for a short time, certain projects funded by the Highway Safety, Traffic Reduction, Air Quality and Port Security Bond Act of 2006, or the Disaster Preparedness and Flood Protection Bond Act of 2006 (Proposition 1B or 1E) from claims of inadequate analysis of greenhouse gas as a legitimate cause of action. This latter provision will be repealed on January 1, 2010.

Executive Order S-3-05 - On June 1, 2005, Governor Arnold Schwarzenegger signed Executive Order S-3-05 (Order) which established GHG emission reduction targets: by 2010, reduce GHG emissions to 2000 levels; by 2020, reduce GHG emissions to 1990 levels; by 2050, reduce GHG emissions to 80 percent below 1990 levels.

3.8.3 Impacts and Mitigation Measures

Significance Criteria

CEQA requires public agencies to identify the potentially significant effects on the environment of projects they intend to carry out or approve, and to mitigate significant effects whenever it is feasible to do so. While AB 32 does not amend CEQA to require new analytic processes to account for the environmental impacts of GHG emissions from projects subject to CEQA, it does acknowledge that such emissions cause significant adverse impacts to the environment. (OPR 2008)

Although Appendix G of the CEQA Guidelines provides a checklist of suggested issues that should be addressed in an EIR, neither the CEQA statutes (Public Resources Code 21000–21177) nor the CEQA Guidelines, (California Code of Regulations, Title 14, Division 6, Chapter 3, Sections 15000–15387) prescribe thresholds of significance or particular methodologies for performing an impact analysis. This is left to lead agency judgment and discretion, based upon factual data and guidance from regulatory agencies and other sources where available and applicable. A threshold of significance is essentially a regulatory standard or set of criteria that represent the level at which a lead agency finds a particular environmental effect of a project to be significant. Compliance with a given threshold means the effect normally will be considered less than significant. The OPR has encouraged, but not required, public agencies to adopt thresholds of significance for environmental impacts. Even in the absence of clearly defined thresholds for GHG emissions, the CEQA statute requires that GHG emissions from projects must be disclosed and mitigated to the extent feasible whenever the lead agency determines that the Project contributes to a significant, cumulative climate change impact. (OPR 2008)

The California Air Pollution Control Officers Association (CAPCOA) published its white paper CEQA and Climate Change in January 2008. The white paper proposes three basic options that APCDs, AQMDs, and other lead agencies can pursue when contemplating the issues of CEQA thresholds for greenhouse gas emissions. The three proposed options are:

1. No significance threshold for GHG emissions;
2. GHG emissions threshold set at zero; or
3. GHG threshold set at a nonzero level.

These three options are presented and described in Section 3.2 of the Greenhouse Gases and Climate Change Technical Report (ENTRIX 2009). A tiered approach with a quantitative threshold based on market capture was selected for the Estates Reservoir Replacement Project Analysis.

Tiered Approach with Quantitative Threshold Based on Market Capture

The goal of a tiered threshold is to maximize reduction predictability while minimizing administrative burden and costs. This would be accomplished by prescribing feasible mitigation measures based on project size and type, and reserving the detailed review of an EIR for those projects of greater size and complexity. This approach may require inclusion in a General Plan or adoption of specific rules or ordinances in order to fully and effectively implement it. (CAPCOA 2008)

A tiered CEQA significance threshold could establish different levels at which to determine if a project would have a significant impact. The tiers could be established based on the gross GHG emission estimates for a project or could be based on the physical size and characteristics of the Project. This approach would then prescribe a set of GHG mitigation strategies that would have to be incorporated into the Project in order for the Project to be considered less than significant. The framework for a tiered threshold would include (CAPCOA 2008):

- Disclosure of GHG emissions for all projects;
- Support for city/county/regional GHG emissions reduction planning;
- Creation and use of a "green list" to promote the construction of projects that have desirable GHG emission characteristics;
- A list of mitigation measures;
- A decision tree approach to tiering; and
- Quantitative or qualitative thresholds.
- CEQA guidance that allows multiple methodologies to demonstrate GHG significance will facilitate the determination of significance for a broad range of projects/plans that would otherwise be difficult to address with a single non-compound methodology. Results of analysis would yield one of three results (CAPCOA 2008):

    - Tier 1 Projects - A net reduction of GHG emissions (Less than Significant or No Impact)
    - Tier 2 Projects - A net increase of GHG emissions but mitigated to zero (Significant but Mitigable)
    - Tier 3 Projects - Mitigation is infeasible due to the cost or lack of available offsets to reduce net emissions to zero (Significant and Unavoidable)

A single quantitative threshold was developed in order to ensure capture of 90 percent or more of likely future discretionary developments. The objective was to set the emission threshold low enough to capture a substantial fraction of future residential and nonresidential development that will be constructed to accommodate future statewide population and job growth, while setting the emission threshold high enough to exclude small development projects that will contribute a relatively small fraction of the cumulative statewide GHG emissions (CAPCOA 2008):

- The GHG emissions associated with 50 single-family residential units and 30,000 square feet of office were estimated and were found to be 900 metric tonnes and 800 metric tonnes, respectively. Given the variance on individual projects, a single threshold of 900 metric tonnes was selected for residential and office projects.
- A 900 metric tonnes threshold was also selected for non-office commercial projects and industrial projects to provide equivalency for different projects in other economic sectors.
- The industrial sector is less amenable to a unit-based approach given the diversity of projects within this sector. One option would be to adopt a quantitative GHG emissions threshold (900 metric tonnes) for industrial projects equivalent to that for the residential/commercial thresholds described above. Industrial emissions can result from both stationary and mobile sources.

CARB estimates that their suggested reporting threshold for stationary sources of 25,000 metric tonnes accounts for more than 90 percent of the industrial sector GHG emissions. If the CARB rationale holds, then a 900 metric tonnes threshold would likely capture at least 90 percent (and likely more) of new industrial and manufacturing sources. (CAPCOA 2008)

Alameda County Climate Change Leadership Strategy Resolution

The Estates Reservoir Replacement Project site is located in Alameda County. On June 6, 2006 the Alameda County Board of Supervisors unanimously adopted a resolution establishing a County Climate Change Leadership Strategy. This resolution commits the County to reduce its contribution of climate-changing gases such as carbon dioxide. In adopting this resolution, the County encourages other local governments throughout the county to take on the challenge of global warming. Key elements of the strategy include:

- Conduct a GHG emissions inventory and forecast;
- Establish County GHG emissions reduction targets;
- Develop an implementation plan to meet the County GHG reduction targets;
- Implement the plan;
- Monitor and review progress;
- Require a collaborative cross-agency approach to develop and implement plans to achieve greenhouse gas reduction targets and to prepare for future effects of global warming;
- Provide administrative oversight for the effort and establish the cross-agency Sustainability Executive Committee a cross-agency Climate Action Team;
- Require that agencies and associated entities should actively participate in meeting GHG reduction targets;
- Require that global warming mitigation and adaptation strategies will be integrated into key County planning processes, budgeting, and training when possible or appropriate;
- Require that the County of Alameda share urgent concerns and key learnings with businesses, the public, and other government agencies (e.g., EBMUD); and

- Encourage other local governments (e.g., City of Oakland) throughout the United States to adopt a similar resolution.

While the resolution does not establish standards of significance, it seeks the cooperation of other government agencies, e.g., EBMUD and the City of Oakland, to participate in the effort to minimize and reduce emissions of GHG. Thus, the Project is subject to the overall goals of the resolution.

Direct GHG emissions generally result from on-site and off-site combustion of fossil fuels (e.g., gasoline, diesel, and natural gas). Indirect GHG emissions are from off-site sources such as gas-fired power plants generating electricity used to operate pumps and lights. The only source of direct GHG emissions during Estates Reservoir Project operation would be associated with periodic inspections and maintenance activities. These emissions would come from motor vehicles used to transport maintenance workers and gas-powered landscape equipment. Such vehicle trips and landscape maintenance would be relatively infrequent events that would not, by themselves, because long-term permanent effects on global climate. Since inspections and maintenance activities are currently performed on the existing reservoir and the site, there would be a negligible change in these emissions; hence, no new impact. Moreover, if the new tanks require less maintenance than the existing reservoir, these emissions would actually decrease. Therefore, the impact assessment focuses on GHG emissions that would occur as a result of Project demolition and construction activities and the potential long-term energy conservation benefit of reduced water losses.

Impacts on global climate that could result from implementation of the proposed Project are described in the following paragraphs. Impacts under CEQA may be direct or indirect.

Direct impacts are primary effects that result from Project construction or operation of a particular feature of the proposed Project (such as demolition of the roof and lining and earthmoving for landscaping), and occur as a direct result of the proposed Project at the same time and place as the proposed Project.

Indirect impacts are those that result indirectly as a secondary effect, such as GHG emissions associated with on-site energy use or off-site truck emissions resulting from transporting demolition debris that cannot be recycled on site. Indirect impacts can occur at another time and place from the Project. While the Project occurs at Estates Reservoir, the potential indirect impacts are felt in the Project vicinity.

Impacts may be short-term or temporary in nature, such as criteria pollutant emissions resulting from diesel fuel combustion, or may be long-term due to Project activities that would endure for an extended period, such as a permanent stationary source of emissions (which the proposed Project is not).

At present, there are no officially promulgated CEQA significance thresholds for GHG emissions in the state or county (CAPCOA 2008). However, CAPCOA has proposed

several different means of assessing significance, as summarized in Section 3.13.3.2. Of these, Threshold 2 – Quantitative Threshold Based on Market Capture is the most conveniently quantitative for various types of projects:

- 900 metric tonnes for residential and office projects; and
- 900 metric tonnes for non-office commercial projects and industrial projects.

CAPCOA believes that the proposed 900 metric tonnes significance threshold would provide equivalency for different projects in various economic sectors. Since this threshold is proposed, not promulgated, there can be no actual conclusion about whether greenhouse gas impacts from the Project are quantitatively significant, nor can the need for, or extent of, actual GHG mitigation measures be addressed.

Impacts and Mitigation Measures

Impact 3.8-1: The concern is whether the Estates Reservoir Replacement Project, primarily through construction related emissions, individually would impede the state's ability to meet its 2020 greenhouse gas emission reduction goal.

The proposed Project would contribute to climate change primarily through the on-site use of diesel powered construction equipment and off-site vehicle traffic. Demolition and subsequent construction activities would be temporary and would be completed in about two years. The combustion of diesel fuel in off-road construction equipment and on-road vehicles would emit GHG consisting mainly of carbon dioxide, along with small amounts of methane and nitrous oxide. **Table 3.8-5**, **Table 3.8-6**, and **Table 3.8-7** show estimated GHG emissions for the Project based on USEPA and EMFAC emission factors for diesel and gasoline fuel internal combustion. See the technical report (ENTRIX 2009) for calculations of GHG emissions.

TABLE 3.8-5
Estimated On-site Greenhouse Gas Emissions

	Demolition Phase		Construction Phase	
Total Project Emissions	**short tons**	**metric tonnes**	**short tons**	**metric tonnes**
Carbon Dioxide (GHG - CO_2)	169	153	622	564
Methane (GHG – CH_4)	0.010	0.009	0.036	0.033
Nitrous Oxide (GHG - N_2O)	0.005	0.004	0.017	0.015
Carbon Dioxide Equiv. (CO_2eq)	170	155	628	569

Sources Compilation of Air Pollution Emission Factors (AP-42), Fifth Edition, USEPA, 1995
Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2006, 2008

TABLE 3.8-6
Estimated Off-site Greenhouse Gas Emissions

	Demolition Phase		Construction Phase	
Total Project Emissions	**short tons**	**metric tonnes**	**short tons**	**metric tonnes**
Carbon Dioxide (GHG - CO_2)	4	4	20	18
Methane (GHG - CH_4)	0.0001	0.0001	0.0001	0.0001
Nitrous Oxide (GHG - N_2O)	0.00004	0.00003	0.0001	0.0001
Carbon Dioxide Equiv. (CO_2eq)	4	4	20	18

Sources: EMFAC 2007
Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2006, 2008

TABLE 3.8-7
Estimated On-site and Off-site Total Greenhouse Gas Emissions

	Demolition Phase		Construction Phase		Total Project	
Project Emissions	**s. tons**	**m. tonnes**	**s. tons**	**m. tonnes**	**s. tons**	**m. tonnes**
Carbon Dioxide (GHG - CO_2)	173	157	642	582	815	739
Methane (GHG – CH_4)	0.010	0.009	0.036	0.033	0.046	0.042
Nitrous Oxide (GHG - N_2O)	0.005	0.004	0.017	0.015	0.021	0.019
Carbon Dioxide Equiv. (CO_2eq)	175	158	647	587	822	746

Sources: Compilation of Air Pollution Emission Factors (AP-42), Fifth Edition, USEPA, 1995
EMFAC 2007
Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2006, 2008

As shown in **Table 3.8-7** the entire Project would cause to be emitted approximately 746 metric tonnes of carbon dioxide equivalents. This is below the CAPCOA recommended (proposed) threshold of 900 metric tonnes and would be less than significant.

For the proposed Project, on site crushing of demolition concrete debris would result in GHG emissions of approximately 40,000 pounds carbon dioxide, one pound nitrous oxide, and two pounds methane from a diesel-powered portable crushing machine. The alternative, hauling concrete debris off-site to a landfill and importing replacement fill dirt using diesel-powered heavy-duty trucks, would cause approximately the same amount of GHG emissions. Therefore, from a climate change perspective, there would likely be no advantage to either the proposed on site crushing or the alternative.

The generation of direct on-site and direct off-site greenhouse gas emissions from equipment and vehicle operation would permanently terminate following completion of construction. The Project would not individually impede the state's ability to meet its 2020 GHG emission reduction goal. Thus, the Project's contribution to the state's ability to meet its 2020 GHG emission reduction goal would be less than significant. Mitigation is not required, and the measures below are optional.

Mitigation Measure 3.8-1: Since the half-life of carbon dioxide is approximately 100 years (USEPA 2008), the effects of GHG affect global climate change over a relatively long time frame. Thus, the 746 metric tonnes of carbon dioxide equivalents emitted by Project demolition and construction activities would remain in the atmosphere for years. Therefore, mitigation measures are recommended to further minimize the potential for any long-term effects of construction emissions on global climate change.

EBMUD and its contractors shall implement the following measures to reduce GHG emissions from fuel combustion:

- On-road and off-road vehicle tire pressures shall be maintained to manufacturer specifications. Tires shall be checked and reinflated at regular intervals.
- Construction equipment engines shall be maintained to manufacturer's specifications.
- Demolition debris shall be recycled for reuse to the extent feasible (excluding wood treated with preservatives).

Implementation of Mitigation Measure 3.8-1, in addition to diesel exhaust control measures as described under Air Quality Impact 3.7-2 (Air Quality Section 3.7), would reduce and sequester greenhouse gas emissions. Additionally, given that other development projects would be required to implement mitigation measures for significant impacts under CEQA, the overall cumulative GHG impacts would be further reduced.

Impact 3.8-2: The proposed Project's greenhouse gas emissions reduction from Project operations over the long term would not contribute to a cumulatively considerable impact to climate change.

Cumulative impacts are those that result from the incremental impacts of an action added to other past, present, and reasonably foreseeable future actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.

The only source of direct emissions during Project operation would be associated with periodic inspections and maintenance activities and largely associated with motor vehicles used to transport maintenance workers. These are relatively infrequent events that would not cause long term permanent effects on global climate. Since inspections and maintenance activities are currently performed on the existing reservoir and pumping plant, there would be a negligible change in these emissions, hence, no new impact. (If the storage tanks and facilities require less maintenance than the existing reservoir, these emissions may actually decrease.)

Permanently eliminating water use by the fountains and reducing reservoir evaporation would also benefit the environment, saving water and electricity used to pump it. The

wetted surface area of the reservoir would be reduced 72 percent from 109,000 square feet (2.5 acres) to 30,800 square feet (0.7 acres), for a net reduction of 1.8 acres. For a typical 3/4 to 1 inch per month evaporation rate, this would save about 1.5 acre-feet or 0.49 million gallons of water annually. Fountain water losses of about 0.4 million gallons per year (mg/yr) would also be eliminated. The new landscape plan would ensure that grasses are mowed up to two times per year.

The completed Project would reduce water losses at the reservoir and fountains and, hence, reduce the amount of electric power required to deliver water to the tanks. EBMUD has estimated the reduction of losses for the reservoir replacement at about 890,000 gallons per year (0.89 mgal/yr). Resultant reductions in electric power consumption and indirect greenhouse gas emissions are shown in **Table 3.8-8** and **Table 3.8-9**.

TABLE 3.8-8
Estimated Water and Power Conservation

Indirect Electric Power	Fountain	Reservoir	Units
Water Losses	0.40	0.49	mgal/yr
Water Losses	1.23	1.50	af/yr
Outdoor Water Use, Northern CA	1170	1170	kw-hr/af
Water Delivery Power Consumption	1436	1759	kw-hr/yr
Water Delivery Power Consumption	1.44	1.76	mw-hr/yr

Sources: ACWA Comments on Chapter 8 – Water Sector
ETAAC Draft Final Report, February 11, 2008

TABLE 3.8-9
Estimated Annual Greenhouse Gas Reductions from Conservation

Application and Purpose	Power Consumption MW-hr/yr	Carbon Dioxide tonnes/yr	Methane tonnes/yr	Nitrous Oxide tonnes/yr	CO2 Equivalents tonnes/yr
Fountain Water Losses	1.44	0.57	0.00002	0.00001	0.57
Reservoir Evaporation Loss	1.76	0.71	0.00003	0.00001	0.71
Totals	**3.20**	**1.28**	**0.00005**	**0.00002**	**1.28**

Source: The Climate Registry General Reporting Protocol, Version 1.1, Chapter 14, May 2008

As shown in **Table 3.8-9**, reduced electric power demands for water delivery would reduce indirect greenhouse gas emissions by about 1.28 tons per year CO_2 equivalents over the long term (life of the Project).

The Estates Reservoir Replacement Project would result in less than significant impacts on global climate. According to the City of Oakland's October-November 2008 Major Project List (incorporated by reference), there are no large scale projects planned for the Project area. However, infill and redevelopment projects may occur in the future in the

City of Oakland. When viewed in combination with other reasonably foreseeable projects, implementation of the Project would result in cumulatively less than significant impacts on global climate for the following reasons:

- The demolition and construction phases of the Project are temporary sources of emissions only, lasting less than two (2) years.
- There would be no quantifiable long-term contribution of greenhouse gases from ongoing post-construction operations.
- Water and power conservation would indirectly reduce emissions of greenhouse gases over the long term. Although these reductions would be relatively small, they would nevertheless reduce cumulative impacts on global climate.

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3.9 Noise and Vibration

3.9.1 Approach to Analysis

This analysis uses two approaches to evaluate temporary construction-phase noise impacts associated with the Estates Reservoir Replacement Project. To evaluate short-term effects of noise peaks, typical construction equipment noise levels were used to estimate corresponding noise levels at the nearest residences. These estimates were then compared against a speech interference criterion. When construction activities would occur at varying levels 24 hours per day and seven days per week, the analysis also evaluates the consistency of construction-related noise with the daytime and nighttime noise ordinance limits and compares them to the speech interference criterion. Noise measurements were taken in various neighborhoods in order to characterize ambient noise. Measurements were also taken at two existing EBMUD pump stations to characterize the representative noise generation potential of such facilities. The terms defined below are used throughout this section.

Noise Descriptors

dB, dBA - Sound is characterized by various parameters that describe the rate of oscillation of sound waves, the distance between successive troughs or crests, the speed of propagation, and the pressure level or energy content of a given sound. The sound pressure level has become the most common descriptor used to characterize the loudness of an ambient sound. The decibel (dB) scale is used to quantify sound intensity. Because sound can vary in intensity by over one million times within the range of human hearing, a logarithmic loudness scale is used to keep sound intensity numbers at a convenient and manageable level. Since the human ear is not equally sensitive to all sound frequencies within the entire spectrum, human response is factored into sound descriptions in a process called "A-weighting," expressed as "dBA." The dBA, or A-weighted decibel, refers to a scale of noise measurement that approximates the range of sensitivity of the human ear to sounds of different frequencies. On this scale, the normal range of human hearing extends from about 0 dBA to about 140 dBA. A 10-dBA increase in the level of a continuous noise represents a perceived doubling of loudness. The noise levels presented herein are expressed in terms of dBA, unless otherwise indicated. **Table 3.9-1** shows the Definition of Acoustical Terms used in this report, and **Table 3.9-2** shows some representative noise sources and their corresponding noise levels in dBA.

TABLE 3.9-1
Definition of Acoustical Terms Used in this Report

Term	Definitions
Decibel, Db	A unit describing, the amplitude of sound, equal to 20 times the logarithm to the base 10 of the ratio of the pressure of the sound measured to the reference pressure. The reference pressure for air is 20.
Sound Pressure Level	Sound pressure is the sound force per unit area, usually expressed in micro Pascals (or 20 micro Newtons per square meter), where 1 Pascal is the pressure resulting from a force of 1 Newton exerted over an area of 1 square meter. The sound pressure level is expressed in decibels as 20 times the logarithm to the base 10 of the ratio between the pressures exerted by the sound to a reference sound pressure (e.g., 20 micro Pascals). Sound pressure level is the quantity that is directly measured by a sound level meter.
Frequency, Hz	The number of complete pressure fluctuations per second above and below atmospheric pressure. Normal human hearing is between 20 Hz and 20,000 Hz. Infrasonic sound are below 20 Hz and Ultrasonic sounds are above 20,000 Hz.
A-Weighted Sound Level, dBA	The sound pressure level in decibels as measured on a sound level meter using the A-weighting filter network. The A-weighting filter de-emphasizes the very low and very high frequency components of the sound in a manner similar to the frequency response of the human ear and correlates well with subjective reactions to noise.
Equivalent Noise Level, Leq	The average A-weighted noise level during the measurement period.
L_{max}, L_{min}	The maximum and minimum A-weighted noise level during the measurement period.
L_{01}, L_{10}, L_{50}, L_{90}	The A-weighted noise levels that are exceeded 1%, 10%, 50%, and 90% of the time during the measurement period.
Day/Night Noise Level, L_{dn} or DNL	The average A-weighted noise level during a 24-hour day, obtained after addition of 10 decibels to levels measured in the night between 10:00 pm and 7:00 am.
Ambient Noise Level	The composite of noise from all sources near and far. The normal or existing level of environmental noise at a given location.
Intrusive	That noise which intrudes over and above the existing ambient noise at a given location. The relative intrusiveness of a sound depends upon its amplitude, duration, frequency, and time of occurrence and tonal or informational content as well as the prevailing ambient noise level.

TABLE 3.9-2
Typical Noise Levels in the Environment

Common Outdoor Noise Source	Noise Level	Common Indoor Noise Source
	120 dBA	
Jet fly-over at 300 meters		Rock concert
	110 dBA	
Pile driver at 20 meters	100 dBA	
		Night club with live music
	90 dBA	
Large truck pass by at 15 meters		
	80 dBA	Noisy restaurant
		Garbage disposal at 1 meter
Gas lawn mower at 30 meters	70 dBA	Vacuum cleaner at 3 meters
Commercial/Urban area daytime		Normal speech at 1 meter
Suburban expressway at 90 meters	60 dBA	
Suburban daytime		Active office environment
	50 dBA	
Urban area nighttime		Quiet office environment
	40 dBA	
Suburban nighttime		
Quiet rural areas	30 dBA	Library
		Quiet bedroom at night
Wilderness area	20 dBA	
Most quiet remote areas	10 dBA	Quiet recording studio
Threshold of human hearing	0 dBA	Threshold of human hearing

Leq, CNEL, Ldn - Time variations in noise exposure are typically expressed in terms of a steady-state energy level (called Leq) that represents the acoustical energy of a given measurement. Leq (24) is the steady-state energy level measured over a 24-hour period. L10 is the noise level that is exceeded 10 percent of the measurement period. Lmax refers to peak noise levels. Because community receptors are more sensitive to unwanted noise intrusion during the evening and at night, state law requires that, for planning purposes, an artificial dBA increment be added to "quiet time" noise levels to form a 24-hour noise descriptor called the Community Noise Equivalent Level (CNEL). CNEL adds a 5-dBA "penalty" during the evening hours (7:00 p.m. to 10:00 p.m.) and a 10-dBA penalty during the night hours (10:00 p.m. to 7:00 a.m.). Another 24-hour noise descriptor, called the day-night noise level (Ldn), is similar to CNEL. While both add a 10-dBA penalty to all nighttime noise events between 10:00 p.m. and 7:00 a.m., Ldn does not add the evening 5-dBA penalty. In practice, Ldn and CNEL usually differ by less than 1 dBA at any given location for transportation noise sources.

Vibration - Vibrations caused by construction activities can be interpreted as energy transmitted in waves through the soil mass. These energy waves generally dissipate with distance from the vibration source (e.g., pile driving or sheet-pile driving). Since energy is lost during the transfer of energy from one particle to another, vibration that is distant from a source is usually less perceptible than vibration closer to the source. However, actual human and structure response to different vibration levels is influenced by a combination of factors, including soil type, distance between source and receptor, duration, and the number of perceived events. If great enough, the energy transmitted through the ground as vibration can result in structural damage. To assess the potential for structural damage associated with vibration, the vibratory ground motion in the vicinity of the affected structure is measured in terms of peak particle velocity (PPV) in the vertical and horizontal directions (vector sum), typically in units of inches per second (in/sec). A freight train passing at 100 feet can cause vibrations of 0.1 inch per second PPV, while a strong earthquake can produce vibration in the range of 10 in/sec PPV.

3.9.2 Setting/Regulatory Framework

Regulatory Framework

Local noise issues are addressed by assessing consistency with applicable noise ordinance standards or general plan guidelines (if there is no noise ordinance). Noise ordinances regulate such sources as mechanical equipment and amplified sounds as well as prescribe hours of heavy equipment operation. Pursuant to 53091 of the State Planning, Zoning and Development Laws, EBMUD is exempt from local government zoning and building ordinances as they relate to the location or construction of facilities for the production, generation, storage or transmission of water. Although ordinances do not strictly apply to EBMUD projects, it is the practice of EBMUD to work with host jurisdictions and neighboring communities during project planning and to conform to local environmental protection policies to the extent possible. For this Project, noise regulations and standards of the City of Oakland, would be applicable. City of Oakland Noise Ordinance standards

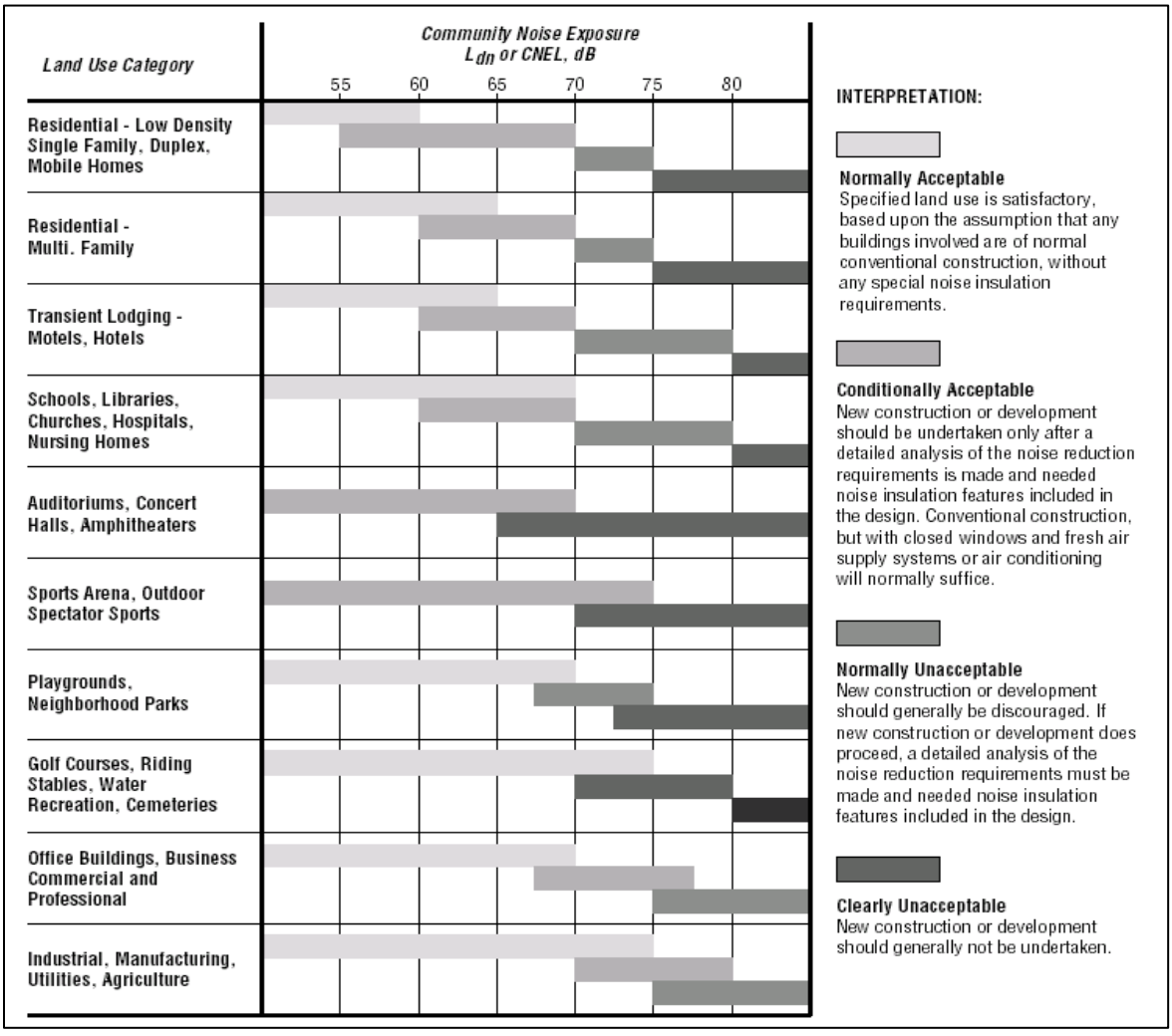
that are relevant to the construction of the Estates Reservoir facilities are incorporated into the significance criteria and summarized in **Table 3.9-3 and 3.9-4.**

TABLE 3.9-3
Applicable Ordinance Time Limits and Noise Standards

	Construction Time Limits		
Jurisdiction	**Weekdays**	**Saturdays**	**Sundays & Holidays**
City of Oakland	7 a.m. to 7 p.m. with 80 dBA limit for <10 days and 65 dBA limit for >10 days	9 a.m. to 8 p.m. with 65 dBA limit for <10 days and 55 dBA limit for>10 days	9 a.m. to 8 p.m. with 65 dBA limit for <10 days and 55 dBA limit for>10 days

Note: Noise Limits- Section 17.120.050 of the Oakland Planning Code stipulates that the noise level between 7:00 a.m. and 10:00 p.m. at the property line of any legal residential activity, school, child care, health care or nursing home, public open space, and similarly sensitive land use must not exceed 60 dBA more than 20 minutes in any hour, 65 dBA more than 10 minutes in any hour, 70 dBA more than 5 minutes in any hour, 75 dBA more than 1 minute in any hour, and 80 dBA for any period of time. These limits are reduced by 15 dBA between 10:00 p.m. and 7:00 a.m. These standards result in a converted Leq noise limit equivalent of 68 dBA between 7:00 a.m. and 10:00 p.m. and 53 dBA between 10:00 p.m. and 7:00 a.m.

TABLE 3.9-4
Noise and Land Use Compatibility Guidelines, City Of Oakland



Project Setting

Estates Reservoir and Montclair Pumping Plant are both located in the Oakland Hills west of Highway 13 south of Moraga Avenue and northwest of Park Boulevard, on a 6.7-acre parcel of land. The Project site is located in a residentially developed area, and about a dozen residences overlook the reservoir. A detailed description of the Project elements, phases and construction activities are contained in Chapter 2 of this EIR.

Existing Noise Environment and Sensitive Receptors

Human response to noise varies from individual to individual and depends on the ambient environment in which the noise is perceived. The same noise that would be highly intrusive to a sleeping person or in a quiet park might be barely perceptible at an athletic event or in the middle of a freeway at rush hour. Effects of noise at various levels can include interference with sleep, concentration, and communication; physiological and psychological stress; and hearing loss. Given these effects, some land uses are considered more sensitive to ambient noise levels than others. In general, residences and schools are among the uses considered to be the most sensitive to noise.

Noise measurements were taken in various neighborhoods surrounding the Estates Reservoir in order to characterize ambient noise (November 1-5, 2007). Measurements were also taken near the Montclair Pumping Plant to characterize the representative noise generation potential (February 6, 2008).

- Estates Reservoir - Estates Reservoir site and Noise Measurement Locations are shown on **Figure 3.9-1**. Estates Reservoir is located south of the intersection of Estates Drive and Bullard Drive in the Montclair District of Oakland. Single-family residences are located along Estates Drive generally north of the reservoir site. Residences are also located to the south of the site between LaSalle Avenue and Wood Court. The noise environment in the neighborhoods surrounding the reservoir would be characterized as a quiet suburban area.

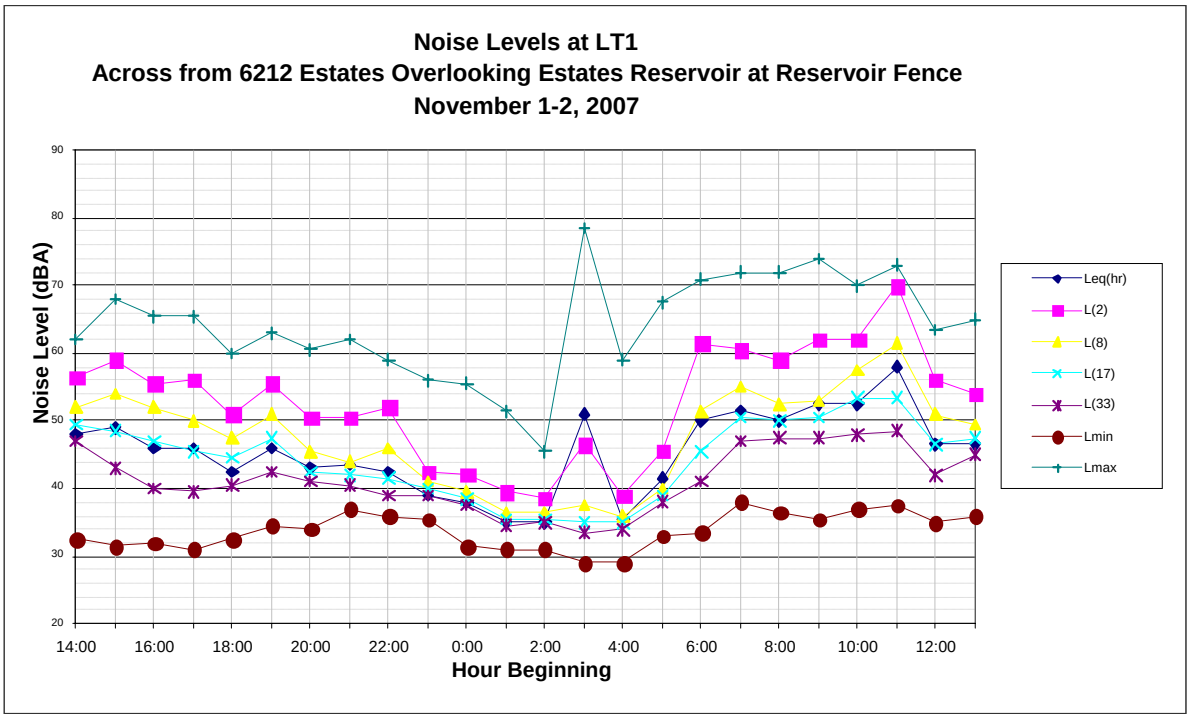
  A noise measurement was made at the reservoir fence on EBMUD property across from 6212 Estates Drive. This location was selected as representative of the area based on field observations (residences are located at varying distances from the active construction area, from about one to several hundred feet). Measurements began during the afternoon of Thursday, November 1, 2007 and concluded during the afternoon of Monday, November 5, 2007. Daytime weather conditions were generally warm, with light to moderate winds. Approximately 0.01 inch of precipitation was recorded on November 2, 2007.

Source: EBMUD 2008

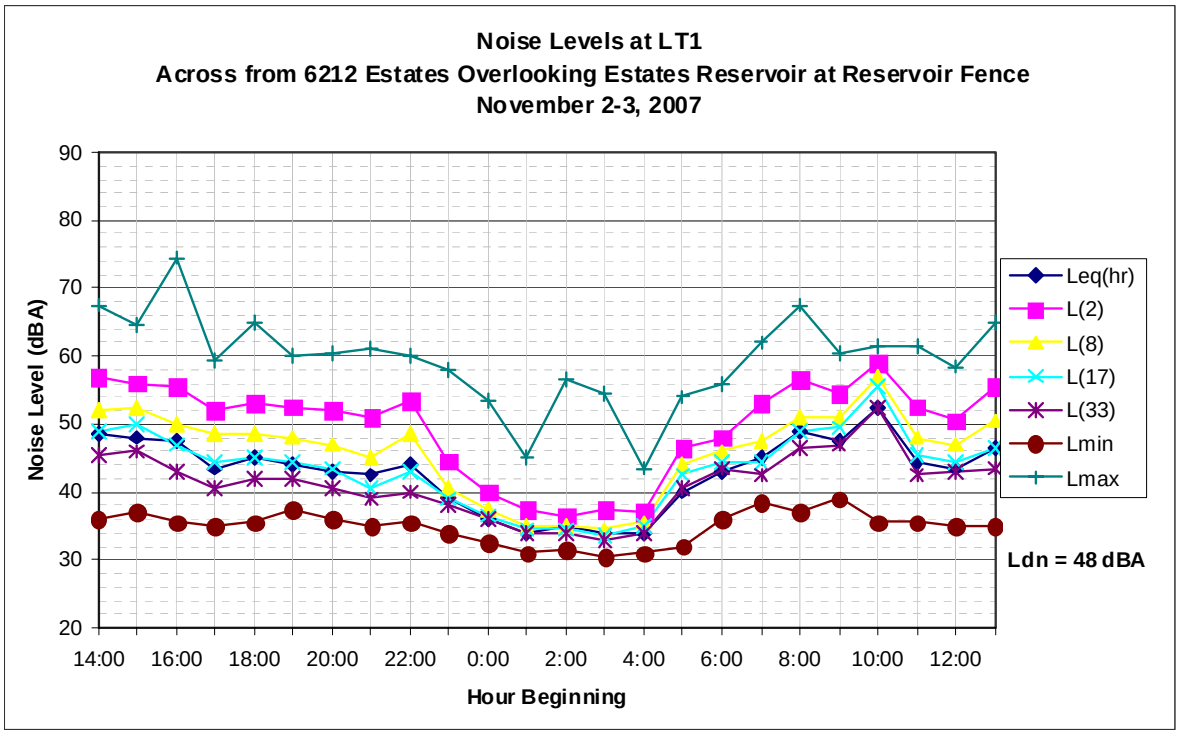
Estates Reservoir Site Noise Measurement Locations
Figure 3.9-1

Data were collected and analyzed in 1-hour intervals over the duration of the noise survey. The data for Estates Reservoir are shown on **Figures 3.9-2a, 3.9-2b, 3.9-3a and 3.9-3b.** During each hour noise levels are analyzed utilizing the statistical descriptors set forth in the Oakland Noise Ordinance. In addition, the hourly L_{eq} and the maximum and minimum noise levels are presented for each hour. The chart also shows the calculated day/night average noise level (L_{dn}) measured for each 24-hour period which ranged from 46 dBA L_{dn} to 53 dBA L_{dn}. The average for the four-day period was 49-50 dBA L_{dn}. Noise sources affecting the environment that were noted during an attended short-term measurement on the afternoon of Monday, November 5, 2007 included cars that generated maximum noise levels of 47-49 dBA, an aircraft overflight that generated a maximum noise level of 59 dBA and audible construction noise from residential construction occurring across the reservoir from the measurement location. The reservoir fountains were not operating during the noise survey.

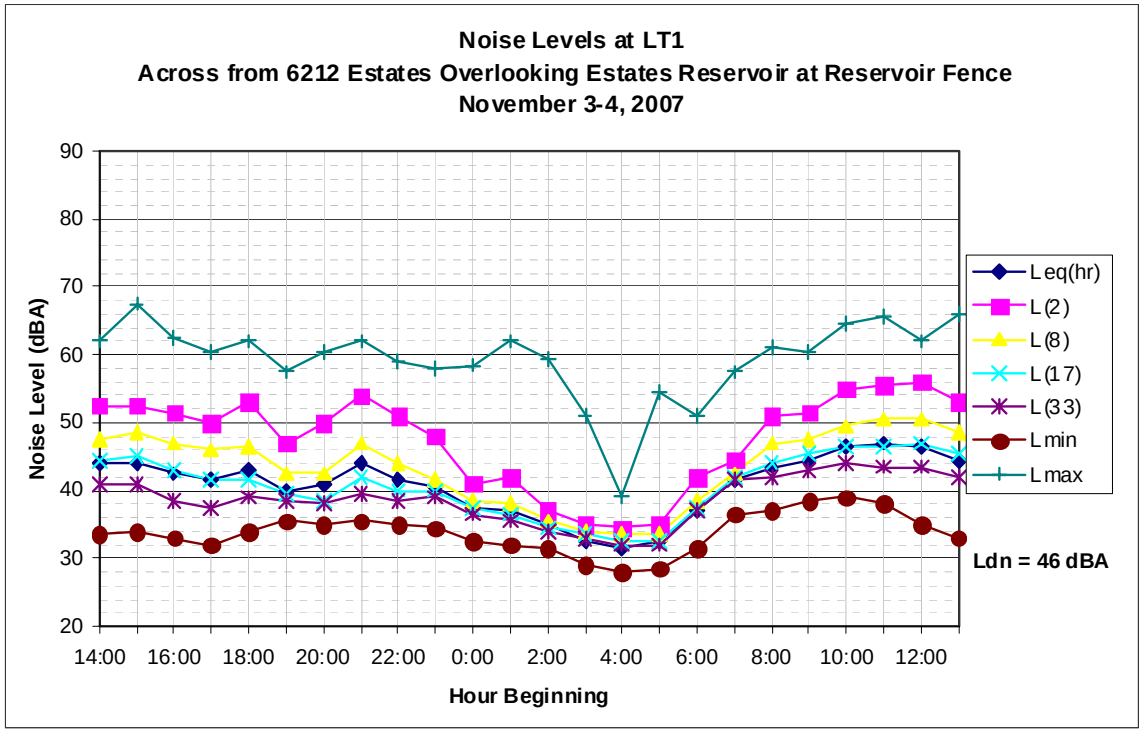
- Montclair Pumping Plant – The Montclair Pumping Plant is located near the southwest corner of the Estates Reservoir. Noise measurements of pumping plant equipment were made on February 6, 2008. Weather conditions were cool/overcast, with zero to very light winds. The pumps are located inside the pump station building. PG&E transformers are located outside. Sound levels were measured near the property corner, about 10 feet from the western façade of the pump station building. The measured ambient noise level, including the sound from the PG&E substation, was 55 dBA prior to operating the pumps. At the pump startup, sound levels incrementally increased momentarily by about 2 dBA to 57 dBA, and then quickly dropped down to 55 to 56 dBA at the monitoring location. At the property line of the nearest residence, located about 35 feet from the pump station building, the sound level was 50 dBA. The operating pumps were barely detectable and made no measurable contribution to the overall sound level in the area. Noise levels were also monitored inside the pump station building. The interior noise level briefly reached 98 dBA L_{max} during startup but typically ranged from 84 to 87 dBA during operation. The building effectively controls pump noise.



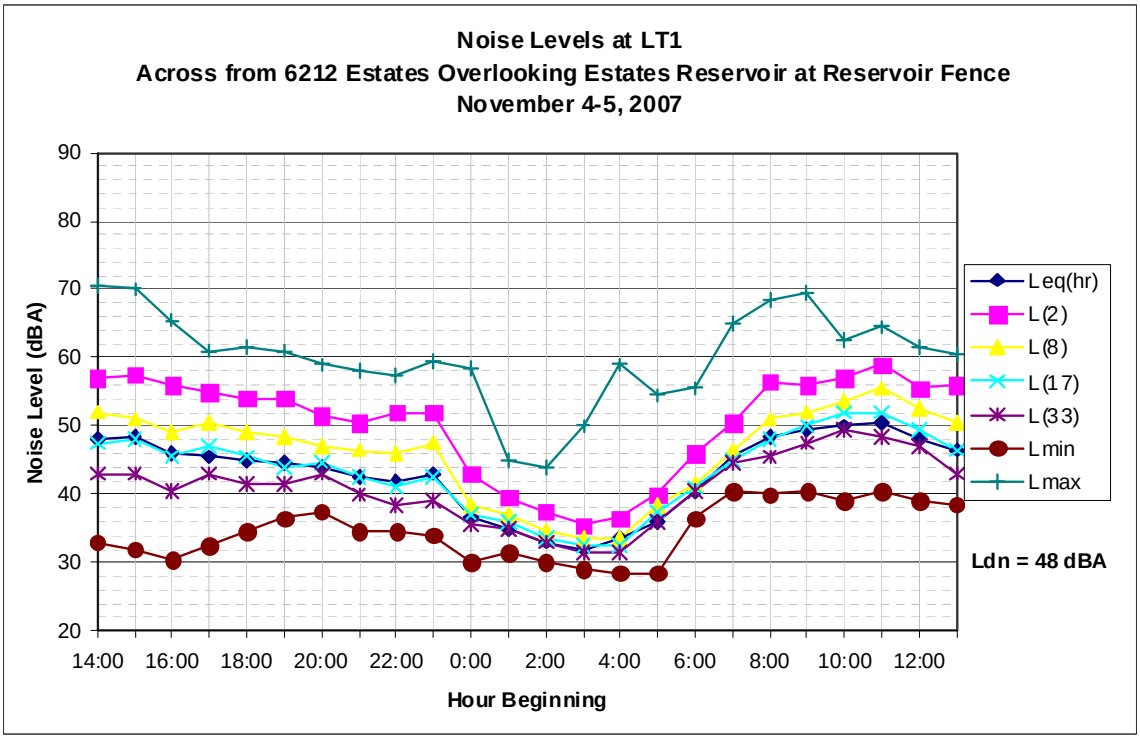
Noise Levels at LT1 November 1-2, 2007
Figure 3.9-2a



Noise Levels at LT1 - November 2-3, 2007
Figure 3.9-2b



Noise Levels at LT1 - November 3-4, 2007
Figure 3.9-3a



Noise Levels at LT1 - November 4-5, 2007
Figure 3.9-3b

3.9.3 Impacts and Mitigation Measures

Significance Criteria

For the purposes of the EIR and consistent with Appendix G of the CEQA Guidelines, a project is considered to have a significant impact if it would substantially increase the ambient noise levels for adjoining areas. This analysis uses the following criteria to define the significance of a predicted increase in noise levels:

- Speech Interference - Speech interference is an indicator of impact on typical daytime and evening activities. A speech interference criterion, in the context of impact duration and time of day, was used to identify "substantial" increases in noise from temporary construction activities. Noise peaks generated by construction equipment could result in speech interference in adjacent buildings if the noise level in the interior of the building exceeds 45 to 60 dBA[18].

  A typical building can reduce noise levels by 25 dBA with the windows closed (U.S. EPA, 1974). This noise reduction could be maintained only on a temporary basis in some cases, since it assumes windows must remain closed at all times. Since a typical building can reduce noise levels by 25 dBA (with closed windows), an exterior noise level of 70 dBA at receptors, would maintain an acceptable interior noise environment of 45 dBA. It should be noted that such noise levels would be sporadic rather than continuous in nature, because different types of construction equipment would be used throughout the construction process.

  For outdoor recreation uses there would be no building attenuation (i.e., noise reduction) benefits. Normal speech at a distance of a few feet generates about 65 dBA. In quiet outdoor environments (noise levels of 45 to 50 dBA), normal speech can occur at distances up to approximately 16 feet (U.S. EPA, 1974). If background noise levels exceed 60 dBA, speech interference can occur at distances greater than 7 to 10 feet. Therefore, the speech interference criterion applied to recreationists is 60 dBA (Leq).

- Local Noise Ordinances - Project-related noise increases and proposed construction hours were compared to the noise level and construction time limits contained in the City of Oakland noise ordinance, for consistency. The City's standards require a noise limit equivalent of 68-dBA between 7:00 a.m.-10:00 p.m. and 53-dBA between 10:00 p.m. and 7:00 a.m.

  Nighttime construction is not planned, but could occur on an emergency basis. Based on available sleep criteria data, an interior nighttime level of 35 dBA is considered

[18] For indoor noise environments, the highest noise level that permits relaxed conversation with 100 percent intelligibility throughout the room is 45 dBA. Speech interference is considered to become intolerable when normal conversation is precluded at 3 feet, which occurs when background noise levels exceed 60 dBA. For outdoor environments, the highest noise level that permits normal conversation at 3 feet with 95 percent sentence intelligibility is 66 dBA (U.S. EPA, 1974).

acceptable (U.S. EPA, 1974). The exterior shell of a house can reduce exterior noise levels by 25 dBA with the windows closed and 15 dBA with the windows open. Due to the long-term nature of project construction, it is expected that affected residents would have their windows open at times during warm weather periods for ventilation. Therefore, exterior noise levels of 50 dBA (windows open) or 60 dBA (windows closed) would maintain an acceptable interior noise environment of 35 dBA. Local ordinance limits of 53 dBA (Leq) would allow windows to be open partially during the night.

The Oakland Noise Ordinance lists noise controls for various construction activities, and notes that the inclusion of these controls is assumed to reduce noise impacts from project construction to less than significant levels. In general, the mitigation measures utilized for this Project will utilize the majority if not all of the City of Oakland's Noise Control Measures.

Impacts and Mitigation Measures

Construction Impacts - This section evaluates noise levels that would be expected from the demolition of Estates Reservoir; the installation of two new replacement tanks; and the rehabilitation work inside the Montclair Pumping Plant. As previously stated, construction will be limited to daytime hours, between 7:00 a.m. to 7:00 p.m. consistent with the City of Oakland's Noise Ordinance. After hours or weekend construction is not anticipated except for unplanned/unexpected occurrences or critical shutdowns approved by EBMUD.

Impact 3.9-1: Construction of the Estates Reservoir Replacement Project could generate intermittent and temporary noise above existing ambient levels.

Construction activities associated with demolition and construction of the Estates Reservoir Replacement Project would result in temporary noise increases to residents along Estates Drive, adjacent to the reservoir site and within the surrounding community. Construction noise levels would fluctuate at any given receptor depending on the type of work, construction phasing, equipment type/duration of use, distance between the noise source and receptor, and the presence or absence of barriers between the noise source and receptor. Residences around the Estates site are located as close as 100 feet from proposed reservoir demolition and tank construction area. Construction-related noise increases would occur intermittently and periodically over a two year period.

Demolition activities at Estates Reservoir site would require a series of steps utilizing the following equipment:

- Drain reservoir – 5-horsepower portable pump and tank truck.
- Remove gravel roofing – laborers with hand tools and haul truck.
- Remove paneling – laborers with hand tools and haul truck.
- Remove joists – laborers with hand tools, chain saws, and crane.

- Remove girders – laborers with hand tools, chain saws, and crane.
- Remove columns – laborers with hand tools, chain saws, and crane and hoe ram.
- Remove lining – laborers with hand tools, and crane, hoe ram, haul trucks, air compressors, concrete recycler (the heavy equipment could also be used in the earlier steps).

Installation of the new tanks at Estates Reservoir would require the following tasks and equipment:

- Tank foundation and floor slabs – crane, drill rig, front and leader, concrete pumper and concrete trucks.
- Tank walls – crane, concrete trucks, concrete pump, and pre-stressing machine.
- Tank roofing – crane, concrete trucks, concrete pump, pre-stressing machine.
- Valve pit piping – crane, concrete trucks, concrete pump, pre-stressing machine.
- Backfilling – bulldozer, compactor, scraper.
- Site restoration – haul truck, backhoe.
- Complete civil work – haul truck, backhoe.
- Demobilization – haul truck, backhoe.

Typical construction equipment noise emission levels at 50 feet, assuming standard controls such as proper mufflers, are shown in **Table 3.9-5**. Based on EBMUD staff experience with other projects, and utilizing the data in **Table 3.9-5**, worst case daily average noise levels can be estimated for each phase during demolition and construction. The corresponding noise level projections are summarized in **Table 3.9-6**. The projections are made by logarithmically summing the noise contributions from operating equipment during each activity at 50 feet and then determining the distance sufficient to reduce the level to 65-dBA.

Residences are located at varying distances from the active construction areas, from about 100 feet to several hundred feet from the perimeter of the reservoir construction area, to within 50 feet of the Montclair Pumping Plant. In general, noise levels drop off at the rate of about 6-dBA with each doubling of distance from the activity center due to attenuation between a site and receptors. Buildings located between a noise source and receptors can also act as noise barriers wherever they interrupt direct lines-of-sight, helping to reduce noise levels at receptors. Residences located directly across from or immediately adjacent to the Estates Reservoir (along Estates Drive) will experience the most noise increase from construction, since there is no structural barrier between these homes and the reservoir site. Residences located beyond Estates Drive or within interior neighborhoods will have structural buffers and will thus experience less noise from construction activities.

TABLE 3.9-5
Construction Equipment 50-Foot Noise Emission Limits

Equipment Category	Lmax Level (dBA)[1,2]	Impact/Continuous
Arc Welder	73	Continuous
Auger Drill Rig	85	Continuous
Backhoe	80	Continuous
Bar Bender	80	Continuous
Boring Jack Power Unit	80	Continuous
Chain Saw	85	Continuous
Compressor[3]	70	Continuous
Compressor (other)	80	Continuous
Concrete Mixer	85	Continuous
Concrete Pump	82	Continuous
Concrete Saw	90	Continuous
Concrete Vibrator	80	Continuous
Crane	85	Continuous
Dozer	85	Continuous
Excavator	85	Continuous
Front End Loader	80	Continuous
Generator	82	Continuous
Generator (25 KVA or less)	70	Continuous
Gradall	85	Continuous
Grader	85	Continuous
Grinder Saw	85	Continuous
Horizontal Boring Hydro Jack	80	Continuous
Hydra Break Ram	90	Impact
Impact Pile Driver	105	Impact
Insitu Soil Sampling Rig	84	Continuous
Jackhammer	85	Impact
Mounted Impact Hammer (hoe ram)	90	Impact
Paver	85	Continuous
Pneumatic Tools	85	Continuous
Pumps	77	Continuous
Rock Drill	85	Continuous
Scraper	85	Continuous
Slurry Trenching Machine	82	Continuous
Soil Mix Drill Rig	80	Continuous
Street Sweeper	80	Continuous
Tractor	84	Continuous
Truck (dump, delivery)	84	Continuous
Vacuum Excavator Truck (vac-truck)	85	Continuous
Vibratory Compactor	80	Continuous
Vibratory Pile Driver	95	Continuous
All other equipment with engines larger than 5 HP	85	Continuous

Notes: 1 Measured at 50 feet from the construction equipment, with a "slow" (1 sec.) time constant.
2 Noise limits apply to total noise emitted from equipment and associated components operating at full power while engaged in its intended operation.
3. Portable Air Compressor rated at 75 cfm or greater and that operates at greater than 50 psi.

TABLE 3.9-6

Demolition and Construction Noise Level Projections

Activity	Duration weeks	Noise Level at 50 Feet *(dBA L_{eq})*	Distance to 65 dBA, *(feet)*
Demolition			
Mobilization	1	*	*
Drain Reservoir	4	77	200
Remove Gravel Roofing	6	75	150
Remove Paneling	1	75	150
Remove Joists	1	88	700
Remove Girders	3	88	700
Remove Columns	3	93	1300
Remove Lining	6	93	1300
Tank Installation			
Reservoir Foundation & Floor Slabs	12	88	700
Reservoir Walls	12	89	800
Reservoir Roofing	9	89	800
Valve Pit Piping/Tank Wrapping	7	88	700
Field Testing and Startup	6	*	*
Backfilling	4	80	300
Site Restoration	4	80	300
Landscaping	8	80	300
Complete Civil Work/Pave	4	80	300
Demobilization	2	*	*

Notes: A noise level of 85-dBA at 50 feet for the concrete recycling operation was based on data from a previous project and included in the "remove lining" activity (ref. Illingworth & Rodkin, Inc.)

* *Noise level less than 65 dBA Leq @ 50 feet*

Typical hourly average demolition and construction-generated noise levels are about 80 to 89- dBA measured at a distance of 50 feet from the equipment/work area during busy construction periods (e.g., earth moving equipment, impact tools, etc.). The highest maximum noise levels generated by Project construction would typically range from about 90 to 93- dBA at a distance of 50 feet from the noise source.

For the Pumping Plant Upgrade, replacement of interior pumps would require use of temporary, exterior pumps, operating around the clock for a period of three to six months maximum, depending on the final work plan. Exterior pump noise is typically in the 85-dBA range, which would exceed the City of Oakland's nighttime ordinance limit of 53-dBA, a significant impact.

There would be variations in noise levels on a day-to-day basis depending on the specific activities occurring at the site. Noise levels generated by the construction of the Project would exceed Oakland's Noise Ordinance standards (which are not applicable to EBMUD) and the ambient noise environment at nearby sensitive land uses, a significant impact.

Construction noise would exceed the 70-dBA speech interference criterion when heavy equipment is operated within 100 to 500 feet of residential/sensitive receptors (distance depends on the type of equipment operated). Implementation of noise controls (Measure 3.9-1b) would reduce construction noise levels to below the 70-dBA speech interference criterion, except for impact equipment. Impact equipment-related noise will be reduced to below the 70-dBA speech interference criterion by implementing additional noise control measures including erecting a temporary sound barrier between the impact equipment and affected residential receptors (Measure 3.9-1c) or using noise blankets, thereby reducing any potential construction noise impacts to a less than significant level.

Proposed reservoir construction hours (7:00 a.m. to 7:00 p.m.) would be consistent with those specified by the City of Oakland Noise Ordinance for weekdays. Operation of temporary pumps during the Montclair Pumping Plant Upgrade beyond the 7:00 a.m. to 7:00 p.m. time frame would require additional noise controls to be consistent with the City's ordinance limits of 53-dBA (Measure 3.9-1b and 1c).

The construction impacts identified for the Estates Reservoir construction have been developed to allow a general assessment of the nature and magnitude of potential construction impacts. The final construction scheduling could result in overlapping impacts due to simultaneous construction of more than one project segment and/or the operation of multiple pieces of equipment. Overlapping noise impacts would be primarily limited to impacts along haul routes, where overlapping construction schedules for two or more construction segments with a common haul route could result in further noise increases. Overlapping traffic impacts along haul-routes are discussed under Impact 3.6-2 (Traffic and Circulation section of the EIR), and in Chapter 5, Cumulative Impacts.

> **Measure 3.9-1a:** Construction at the Estates Reservoir site will be restricted to the weekday hours of operation consistent with the City of Oakland's Noise Ordinance (as listed in **Table 3.9-3**), except during critical water service outages or other emergencies and special situations.
>
> Noise-generating activities greater than 90 dBA shall be limited to between 8:00 a.m. and 4:00 p.m., Monday through Friday, and shall be limited in duration as shown on Table 3.9-6. Removal of the reservoir lining and columns is expected to take up to 9 weeks, maximum, but may be of shorter duration if tasks overlap.
>
> Any construction activity proposed for special activities outside of the standard construction hours of 7:00 a.m. to 7:00 p.m. (Monday through Friday) must be approved by EBMUD.

Measure 3.9-1b: Measures that would be implemented to reduce noise levels during construction include, but are not limited to the following:

- Truck operations (haul trucks and concrete delivery trucks) will be limited to the daytime hours listed in the Project Description (7:00 a.m. - 7:00 p.m.).
- Best available noise control techniques (including mufflers, intake silencers, ducts, engine enclosures, and acoustically attenuating shields or shrouds) will be used for all equipment and trucks, as necessary.
- The noisiest phases of construction (such as concrete breaking or concrete grinding) shall be time limited and not extended over several months.
- Stationary noise sources will be located as far from sensitive receptors as possible. If they must be located near receptors, adequate muffling (with enclosures) will be used. Enclosure opening or venting will face away from sensitive receptors. Enclosures will be designed by a registered engineer regularly involved in noise control analysis and design.
- Material stockpiles as well as maintenance/equipment staging and parking areas (all on site) will be located as far as practicable from residential receptors.
- An EBMUD contact person will be designated for responding to construction-related issues, including noise. The phone number of the liaison will be conspicuously posted at construction areas, on all advanced notifications, and on the EBMUD Project website. This person will take steps to resolve complaints, including coordinating periodic noise monitoring, if necessary.

Measure 3.9-1c: EBMUD will make a reasonable effort to limit operation of impact construction equipment during the hours of 8:00 a.m. - 4:00 p.m. by implementing the following measures for noise generating activities that may be greater than 90-dBA, including hoe-rams, concrete recycling, concrete break-up, pulverizing, rebar separation, crushing) and concrete pumping:.

- If impact equipment (e.g., jack hammers, pavement breakers, and rock drills) is used during Project construction, hydraulically or electric-powered equipment will be used wherever feasible to avoid the noise associated with compressed-air exhaust from pneumatically powered tools. However, where use of pneumatically powered tools is unavoidable, an exhaust muffler on the compressed-air exhaust will be used (a muffler can lower noise levels from the exhaust by up to about 10 dB). External jackets on the tools themselves will be used, where feasible, which could achieve a reduction of 5 dB. Quieter procedures, such as drilling rather than impact equipment, will be used whenever feasible.
- Erect temporary noise barriers or noise control blankets around the construction site, particularly along on sites adjacent to residential buildings.
- Utilize noise control blankets or barriers where feasible to reduce noise emission from the site.
- Evaluate the feasibility of noise control at the receivers by temporarily improving the noise reduction capability of adjacent buildings by the use of sound blankets for example.

- Limit the noisiest phases of construction to 10 working days at a time, where feasible.
- Notify neighbors/occupants within 300 feet of Project construction at least thirty days in advance of extreme noise generating activities about the estimated duration of the activity.

The effectiveness of noise attenuation measures shall be monitored by taking noise measurements during noise intensive activities of 90 dBA or greater over a nine week period. However, it should be noted that although the goal is to limit construction noise to the minimal feasible duration and to reduce noise levels to minimize disturbance to sensitive receptors (adjacent residents), mitigated construction noise could still cause occasional, intermittent or periodic disturbance at the closest residential receptors. In recognition of this possibility and based on the significance criteria, construction noise impacts are therefore considered significant and unavoidable, even with mitigation.

Significance after Mitigation: Significant and Unavoidable.

Impact 3.9-2: Construction of the Estates Reservoir Replacement Project could increase noise levels along truck haul routes.

Truck noise levels depend on vehicle speed, load, terrain, and other factors. The effects of construction-related truck traffic would depend on the level of background noise already occurring at a particular receptor site. In quiet noise environments (Leq averaging 50 dBA), one truck per hour would be noticeable, even though such a low volume would not measurably increase noise levels. In slightly noisier environments (Leq averaging 60 dBA), the threshold level is higher, and it would take 10 trucks per hour to noticeably increase the noise exposure. In moderately noisy environments (Leq averaging 70 dBA), a noise increase would be perceptible with the addition of 100 trucks per hour. In quiet environments or during quieter times of the day, truck noise is mainly a single-event disturbance; although the hourly average associated with short, single events is not very high, individual noise peaks of up to 91 dBA at 50 feet can occur during a single truck passage. In noisy environments or during less noise-sensitive hours, truck noise is perceived as a part of the total noise environment rather than as an individual disturbance.

Throughout the demolition and construction periods, there would be worker vehicle trips and either haul trucks or materials trucks accessing the Estates Reservoir site. Haul routes include local residential streets (with quiet noise environments) to arterials with moderately noisy environments, and regional freeways. Truck volumes would vary from day to day, and the maximum number of daily truck trips would reach 120 to 150 materials trucks during the reservoir construction period at Estates Reservoir (refer to **Table 3.6-5**, Traffic and Circulation section of the EIR).

The combination of truck trips and/or vehicle trips is calculated to generate an hourly average noise level of up to 62 dBA L_{eq} along the access roadways. A review of the existing ambient noise level data indicates ambient noise levels typically in the range of 45 to 50 dBA L_{eq} during the daytime periods when construction-related traffic would be

accessing the local streets. Construction traffic could, therefore, result in up to a 17 dBA increase in hourly average noise levels. This would be a substantial increase in noise during the approximately 29 weeks when a large number of daily heavy truck trips is anticipated, and would be noticeable to some residents. However, the estimated maximum hourly truck noise levels would not exceed the 70-dBA speech interference criterion. Therefore, short-term maximum noise increases due to Project related trucks would be less than significant. Consistent with the Oakland Noise Ordinance, the hours for hauling materials and for deliveries would be the same as the general construction hours, limited to 7:00 a.m. to 7:00 p.m., Monday through Friday, which would further reduce the potential for significant impact. Night and evening truck trips would not normally occur (only during service outages, and emergencies and special situations); thus, there would be little or no contribution of truck noise to the Community Noise Equivalent Level (CNEL) during the more sensitive evening and nighttime hours. Implementation of Mitigation Measure 3.9-1.b would also ensure that truck traffic noise would be less than significant.

Significance after Mitigation: Less than Significant.

Impact 3.9-3: Construction of the Estates Reservoir Replacement Project could cause vibration that could disturb local residents and cause cosmetic damage to buildings and structures.

Vibrations of 0.012 in/sec Peak Particle Velocities (PPV) can cause residential annoyance (similar to vibrations from a heavy truck passing at 100 feet) (Wilson, Ihrig & Associates, 2003). Monitoring data for a tunnel/pipeline project in San Francisco indicate that vibration was below the level of annoyance for most residents when vibration levels were maintained at 0.1 in/sec PPV or less (i.e., no complaints were received) (ESA, 1997).

While very low vibration levels (0.01 in/sec PPV) can cause annoyance, higher vibration levels can cause structural damage. The U.S. Bureau of Mines uses a criterion of 2.0 in/sec PPV to avoid any structural damage to buildings (Wilson, Ihrig & Associates, 2003). In general, cosmetic damage to residential buildings can occur at PPVs over 0.5 in/sec, while structural damage to residential buildings can occur at PPVs over 2.0 in/sec (Wilson, Ihrig & Associates, 2003).

Measurements collected during various construction activities (including pavement breaking, vibratory sheetpile driving, sheetpile driving by an excavator shovel, vibratory soil compaction, and earth excavation) at an unrelated project were found to produce vibration levels ranging between 0.03 to 0.38 in/sec PPV at 30 to 35 feet (ESA, 1997).

Excavation activities associated with demolition of the existing reservoir concrete liner and concrete columns could generate perceptible vibration levels. Sheetpile driving to construct the buried replacement tanks is another potential source of vibration. Vibration potential from sheetpile driving as well as other construction activities would depend on soil type and proximity to residential receptors. Implementation of the performance PPV required in Measure 3.9-3 would preclude cosmetic or structural damage to nearby residential or other sensitive structures. However, it is possible that vibration would be

perceptible and could temporarily annoy the closest residential receptors during Project construction.

> **Measure 3.9-3**: To prevent cosmetic or structural damage to adjacent or nearby structures, EBMUD will incorporate into contract specifications restrictions on construction whereby surface vibration will be limited to no more than 0.5 in/sec PPV, measured at the nearest residential or other sensitive structure.

Significance after Mitigation: Less than Significant.

Operational Impacts

Impact 3.9-4: Noise increases during facility operations.

Long-term operation of the Replacement Estates Reservoirs and refurbished Montclair Pumping Plant will not result in noise increases, over the levels currently experienced for the existing facilities. In fact, burying the replacement tanks and replacing old pumps and electrical equipment with new equipment is expected to reduce operating noise levels below what is currently experienced. There is no record of complaints associated with operational noise at the Estates Reservoir site. Replacement pipeline would be located underground and would not generate noise. Therefore, no further discussion of operational noise associated with pipelines, the replacement reservoirs or the refurbished pumping plant is provided.

Mitigation Measure: None Required.

References

City of Oakland Noise Ordinance, Oakland Planning Code sections 17.120.050, and 8.18, 1996.

U.S. Environmental Protection Agency, Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety ((Condensed Version), Washington D.C. (EPA/ONOC 550/9-74-004), 1974.

Illingworth & Rodkin, Inc. 2007 (updated 2009).

Wilson, Ihrig & Associates, Based on Measurement Data and Field Observations From Various Locations in California, EBMUD Claremont Corridor Seismic Improvements Project: Construction Vibration Impact Analysis, Draft Technical Report, 2003, as cited in the EBMUD Water Treatment and Transmission Improvement Program Draft EIR, June 2006.

Environmental Sciences Associates, San Francisco Recycle Water Master Plan and Groundwater Master Plan, Final EIR, August 1997, as cited in the EBMUD Water Treatment and Transmission Improvement Program Draft EIR, June 2006.

Chapter 4
Analysis of Alternatives

4.1 Introduction and Approach

This chapter summarizes the alternatives analysis and screening process, describes and analyzes the No Project Alternative, compares the environmental impacts of the Estates Reservoir Replacement Alternatives, and identifies the environmentally superior alternative.

4.1.1 CEQA Requirements for Alternatives Analysis

The California Environmental Quality Act (CEQA) Guidelines require Environmental Impact Reports (EIR) to describe and evaluate a reasonable range of alternatives to a project, or to the location of a project, which could feasibly attain most of the basic project objectives and avoid or substantially lessen significant project impacts. The CEQA Guidelines, Section 15126.6, set forth the following criteria for alternatives:

- Identifying Alternatives. The range of alternatives is limited to those that would avoid or substantially lessen any of the significant effects of the Project, are feasible, and would attain most of the basic objectives of the Project. Factors that may be considered when addressing the feasibility of an alternative include site suitability, availability of infrastructure, general plan consistency, other plans or regulatory limitations, jurisdictional boundaries, economic viability, and whether the proponent can reasonably acquire, control, or otherwise have access to an alternative site. An EIR need not consider an alternative whose impact cannot be reasonably ascertained and whose implementation is remote and speculative. The specific alternative of "no project" must also be evaluated along with its impact.
- Range of Alternatives. An EIR need not consider every conceivable alternative, but must consider a reasonable range of alternatives that will foster informed decision-making and public participation. The "rule of reason" governs the selection and consideration of EIR alternatives, requiring that an EIR set forth only those alternatives necessary to permit a reasoned choice. The lead agency (EBMUD) is responsible for selecting a range of project alternatives for examination and must publicly disclose its reasons for selecting those alternatives.
- Evaluation of Alternatives. EIRs are required to include sufficient information about each alternative to allow meaningful evaluation, analysis, and comparison with the Project. Matrices may be used to display the major characteristics of each alternative and environmental effects of each alternative. If an alternative would cause one or more significant effects not caused by the Project as proposed, the

significant effects of the alternative must be discussed but in less detail than the significant effects of the Project.

In general there are two approaches that may be reviewed in an EIR.

- Alternatives to the Project that are other projects entirely, or other approaches to achieving the Project objectives rather than the project or modified project.
- Alternatives of the Project that include modified project components, such as alternative project sites or modified facilities, layout, size and scale.

This alternatives analysis evaluates both types of alternatives in order to develop a reasonable range of alternatives for evaluation in this EIR.

The objectives of this Project are defined in Chapter 2.

4.1.2 Approach to Alternatives Analyses

The alternatives analysis and screening phase consisted of a systematic process that examined the overall project objectives and identified a range of alternatives for review prior to selection of a specific project for detailed analysis in the EIR.

The Estates Reservoir Replacement Project is the result of a five-year planning effort that included consideration of numerous variations of projects schemes and alternatives during the development stage. Sources of alternatives considered included background reports prepared for improvements to the Dingee Pressure Zone (i.e., the 2005 Pressure Zone Planning Program [PZPP]), comments made during the 2007 and 2008 public meetings, the July 2009 Facilities Improvement Plan for the Central Oakland Hills Cascade (Piedmont and Dingee Pressure Zone Improvements) and the 2008 (updated 2009) Concept Design Process and Recommendation Report for Estates Reservoir, by Royston Hanamoto Alley & Abey (RHAA). Variations of project schemes were reduced to several reasonable alternatives consistent with the requirements of CEQA.

4.1.3 Alternatives Considered in this EIR

The alternatives identified during the alternatives analysis phase are discussed in this EIR, consistent with the requirements of CEQA. These alternatives, although they may reduce some impacts associated with the Project, were eliminated from further consideration because they were determined to result in greater overall environmental impacts or to be infeasible based on project objectives, cost, and design and/or construction considerations. The alternatives considered in this EIR include:

- Reservoir rehabilitation and replacement alternatives at the Dingee, Estates and/or Piedmont Reservoir sites; i.e., Alternatives to the Project.
- Concept design alternatives for replacement storage at the Estates Reservoir site; i.e., Alternatives of the Project.
- No Project Alternative.

Section 4.2 describes the Project alternatives and related environmental assessment while Section 4.3 describes and assesses the alternatives of the Project (also referred to as concept design alternatives) for replacement storage at the Estates Reservoir site. Section 4.4 describes the No Project Alternative and Section 4.5 compares the alternatives and identifies the environmentally preferred alternative.

4.2 Project Alternatives

Description

Project requirements used to evaluate alternatives include the ability to reduce seismic hazard, improve water quality, and improve operational reliability, flexibility and redundancy, as well as to reduce costs. Hydraulic modeling was performed to verify existing conditions and to evaluate alternative system changes involving various reservoirs, regulators and pumping plants, as well as outage configurations. Hydraulic modeling scenario/results are detailed in the referenced Facilities Improvement Plan.

Screening of alternatives also include Project construction consideration such as site access, Project staging, construction schedule and other related efforts required to be implemented for a given alternative.

Projects were further screened against the potential to generate impacts to key environmental factors as analyzed in this EIR, i.e., Visual Quality, Geology Soils and Seismicity, Biological Resources, Cultural Resources Transportation/Traffic, Air Quality Greenhouse Gases, and Noise and Vibration.

An alternatives analysis matrix was developed to determine which facility upgrades would optimize the use of existing facilities and property owned by EBMUD in the most cost-effective manner. The alternatives matrix, shown in Table 4.1**,** compares the selected alternative (i.e., the proposed Project) against the other alternatives to the Project. The No Project Alternative is listed in Table 4.1, but evaluated in Section 4.4 below.

TABLE 4-1

Estates Reservoir Replacement Project
Evaluation of Alternatives to the Project

	PZPP[1]	Alternative 1[2]	Alternative 2[3] *Proposed Project*	Alternative 3[4]	Alternative 4[5]	No Project
Project Requirements						
Seismic Hazard Reduction	Good	Adequate	Good	Good	Good	Poor
Water Quality Improvements	Good	Poor	Good	Good	Good	Poor
Operational Reliability, Flexibility and Redundancy	Improved	Adequate	Improved	Improved	Improved	Poor
Eliminates future DSOD requirements	Yes	No	Yes	Yes	Yes	No
Project Cost, $ (in Millions)	$22 M	$18M	$15M	$19M	$25M	
Project Construction						
Site Access	Good	Good	Good	Poor	Good	--
Staging/Stockpiling	Good	Good	Good	Poor	Good	--
Construction Time Frame	3-4 years	2-3 years	2 years	3 years	5 years	
Pipeline	--	--	--	required	--	--
Construct New Pumping Plant	--	--	--	required	--	--
Potential Impacts						
Visual Quality						
Estates Reservoir Site	LTSM	LTSM	LTSM	--	LTSM	--
Dingee Reservoir Site	--	LTSM	--	LTSM	LTSM	--
Piedmont Reservoir Site	LTSM	--	--	--	LTSM	--
Geology						
Estates Reservoir Site	LTSM	LTSM	LTSM	--	LTSM	--
Dingee Reservoir Site	--	LTSM	--	LTSM	LTSM	--
Piedmont Reservoir Site	LTSM	--	--	--	LTSM	--
Biological Resources						
Estates Reservoir Site	LTSM	PSI	LTSM	--	LTSM	--
Dingee Reservoir Site	--	LTSM	--	PSI	LTSM	--
Piedmont Reservoir Site	LTSM	--	--	--	LTSM	--

TABLE 4-1
(Continued)
Estates Reservoir Replacement Project
Evaluation of Alternatives to the Project

	PZPP[1]	Alternative 1[2]	Alternative 2[3] *Proposed Project*	Alternative 3[4]	Alternative 4[5]	No Project
Cultural Resources						
Estates Reservoir Site	SUM	SUM	SUM	--	SUM	--
Dingee Reservoir Site	--	LTSM	--	LTSM	LTSM	--
Piedmont Reservoir Site	PSI	--	--	--	PSI	--
Traffic Circulation						
Estates Reservoir Site	SUM	SUM	SUM	--	SUM	--
Dingee Reservoir Site	--	SUM	--	SUM	SUM	--
Piedmont Reservoir Site	SUM	--	--	--	SUM	--
Air Quality, Greenhouse Gases						
Estates Reservoir Site	LTSM	LTSM	LTSM	--	LTSM	--
Dingee Reservoir Site	--	LTSM	--	LTSM	LTSM	--
Piedmont Reservoir Site	LTSM	--	--	--	LTSM	--
Noise and Vibration						
Estates Reservoir Site	SUM	SUM	SUM	--	SUM	--
Dingee Reservoir Site	--	SUM	--	SUM	SUM	--
Piedmont Reservoir Site	SUM	--	--	--	SUM	--
Alternatives Eliminated, see section	Section 4.2	Section 4.2		Section 4.2 & 4.5	Section 4.2	Section 4.4

Notes:
1. *Alternative PZPP: Install two tanks at Estates Reservoir, Demolish Dingee, Install one tank at Piedmont Reservoir, Demolish Redwood Reservoir and install two regulators*
2. *Alternative 1: Rehabilitate Estates and Dingee Reservoir, regulate to Piedmont Pressure Zone and keep Redwood Reservoir*
3. *Alternative 2: Install two tanks at Estates, regulate to Piedmont Pressure Zone, keep Redwood Reservoir*
4. *Alternative 3: Install two tanks at Dingee, regulate to Piedmont Pressure Zone, keep Redwood Reservoir; Montclair Pumping Plant and discharge moved to Estates Reservoir site*
5. *Alternative 4: Install tanks at 1.75MG Dingee, 1.75MG Estates, and 5MG Piedmont, Demolish Redwood Reservoir, and install Redwood regulator*

Legend:
LTSM Less than Significant with Mitigation
PSI Potentially Significant Impact
SUM Significant/Unavoidable with Mitigation
-- *Less than Significant or No Impact*

Pressure Zone Planning Program (PZPP)

This alternative is not recommended because it entails the demolition and construction of new facilities at multiple sites, i.e. the Piedmont and Estates Reservoir sites. This alternative will generate a longer construction schedule as well as a greater impact to key environmental factors compared to the proposed Project due to construction work at two reservoir sites.

Alternative 1 - Rehabilitate Estates and Dingee Reservoirs

Rehabilitating Estates and Dingee reservoir is not recommended because it does not meet the Project requirement of reducing excess pressure zone storage and does not permanently resolve dam embankment concerns of the Division of Safety of Dams (DSOD) for the Estates Reservoir site. This alternative will also generate a longer construction schedule and greater environmental impact compared to the proposed Project due to construction on the embankments at both reservoir sites.

Alternative 2 (Proposed Project) - Two new tanks at Estates Reservoir

Construction of two replacement water storage tanks at the Estates Reservoir site (the proposed Project) was ultimately selected as the preferred Project because it would resolve the problem of excess storage in the Dingee Pressure Zone, meet operational needs at a competitive cost, and resolve seismic concerns raised by the DSOD by removing the Estates Dam permanently from DSOD jurisdiction.

Alternative 3 - Two new tanks at Dingee Reservoir

Construction of replacement reservoirs at the Dingee Reservoir site would generate greater impacts as identified for the Estates Reservoir (excluding Cultural Resources) and a longer construction period resulting from limited space for construction staging and stockpiling activities. Dingee is a 2 acre site versus the 6.9 acre Estates Reservoir site. Over 42,000 cubic yards of excavated material would have to be disposed off site and 30,000 cubic yards of this material returned for backfill purposes. Approximately 16,000 truck round trips would be required for the combined off-hauling and importing of the excavated material. Additional environmental impacts would include construction (noise, air quality and traffic) impacts associated with installing 2,000 feet of pipeline in residential streets. Finally, EBMUD would incur a potential risk of damaging adjacent residential homes and landscaping trees due to required excavation abutting to the North and east side property line. One 42-inch diameter Redwood tree located seven feet from the east-side property line would likely be damaged during construction.

Alternative 4 - New tanks at Dingee, Estates, and Piedmont Reservoir sites

This alternative is not recommended because it entails the demolition and construction of new facilities at three sites, i.e., the Dingee, Estates and Piedmont Reservoir sites. As a result, this alternative will generate the longest construction duration and greatest environmental impacts compared to the proposed Project.

Environmental Assessment

Potential impacts associated with the Proposed Project (including the demolition of the existing Estates Reservoir and roof/features and construction of the replacement buried tanks) are similar to but less than that for the other project alternatives with regard to traffic and circulation, noise, air quality, greenhouse gases (GHG), visual quality, and seismicity, with one exception. Demolition of the Estates roof and features constitutes a permanent loss of facilities which constitutes a Significant and Unavoidable impact to Cultural Resources (even with mitigation). The other project alternatives also involve construction at more than one site and for a longer duration. All of the other project alternatives were eliminated from consideration based on the inability to meet the Project's basic objectives and further reduce the potential for environmental impacts.

4.3 Alternatives of the Proposed Project

Description

Community input from a series of public meetings, resulted in the development of five concept design alternatives for the replacement Project at the Estates Reservoir site. Details of the process are contained in the *Estates Reservoir Final Concept Design Process and Recommendations Report, 2008 (updated 2009)*, prepared by Royston, Hanamoto, Alley and Abey (RHAA) and summarized in Appendix A, Public Involvement. The five concept design alternatives were modeled around three general design categories (or themes), also shown in graphically in **Figure 4-1.**

A. Preservation - To sustain the existing form, integrity, and materials of the existing site and features. The form remains the same, retaining its distinctive materials, features, spaces and spatial relationships. There was one alternative in the preservation category (i.e., Option 1).

Option 1 preserves the existing roof and fountain structures with the new tanks being constructed beneath; seismic upgrades would be required for both the roof and fountain structures. This option does not address the water quality and excess storage problems in the Dingee Pressure Zone, or the issue of aging infrastructure.

PRESERVATION

TO SUSTAIN THE EXISTING FORM, INTEGRITY, AND MATERIALS OF AN HISTORIC FORM.

FORM remains the same, retaining its distinctive materials, features, spaces and spatial relationships.

OPTION **1**

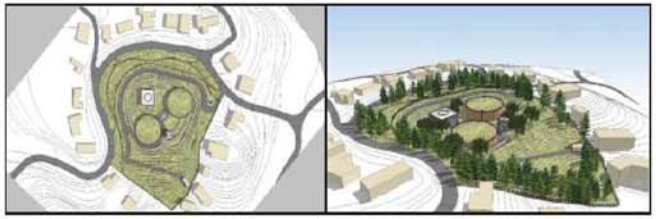
- TANKS CONSTRUCTED UNDER EXISTING ROOF STRUCTURE - SEISMIC UPGRADES REQUIRED
- FOUNTAIN STRUCTURE & EXISTING ROOF STRUCTURE PRESERVED

ADAPTIVE REUSE

SITE WILL BE ALTERED.

PORTIONS of existing visible structure may be perserved/retained with some change to its distinctive materials, features, spaces and spatial relationships

OPTION **2**



- ROOF STRUCTURE REMOVED - ROOF FORM REVEALED IN WALLS
- BOTH FOUNTAIN STRUCTURES PRESERVED
- TANKS PARTIALLY BURIED

OPTION **3**

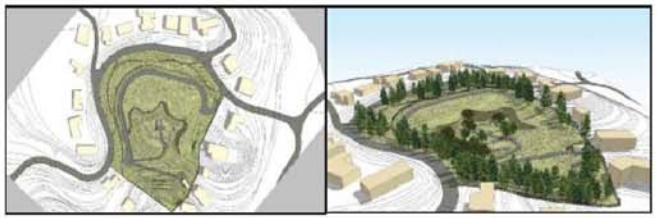
- TANKS BURIED
- LARGE FOUNTAIN STRUCTURE PRESERVED

COMPLETE ALTERATION

NEW SITE DESIGN.

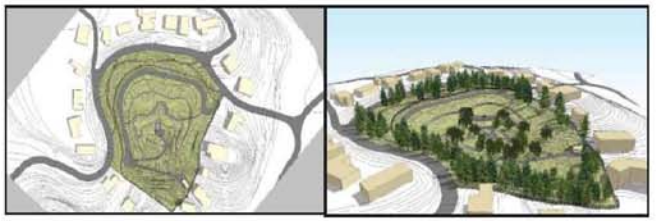
SIGNIFICANT PORTIONS of the site will be altered both physically and visually.

OPTION **4**



- ROOF REMOVED - ARCHITECTURAL LANDSCAPE WALL
- FOUNTAINS REMOVED
- TANKS PARTIALLY BURIED

OPTION **5**



- ROOF REMOVED - ARCHITECTURAL LANDSCAPE WALL
- FOUNTAINS REMOVED
- TANKS BURIED

Source: EBMUD 2008

Estates Reservoir Concept Design Categories/Options
Figure 4-1

B. Adaptive Reuse – The Project site will be altered and portions of the existing visible structure may be preserved or retained with some change to its distinctive materials, features, spaces and spatial relationships. There were two alternatives in the adaptive reuse category (i.e., Options 2 and 3):

Option 2 removes the roof structure entirely. However, the form of the existing roof is copied with retaining walls surrounding the inside of the reservoir basin. Both fountain structures are preserved, with the new tanks partially buried in the northwest and southeast corners.

Option 3 removes the roof structure entirely and preserves the large fountain structure. The new tanks are significantly buried in the northwest and southeast corners of the basin.

C. Complete Alteration – The Site will be completely redesigned with significant portions altered both physically and visually. There were two alternatives in the complete alteration category (i.e., Options 4 and 5):

Option 4 removes the roof structure entirely. The new tanks are located on the eastern end of the basin. They are entirely buried with the exception of the curved west-facing architectural wall. Both fountain structures are removed.

Option 5 removes the roof structure entirely. The new tanks are located on the eastern end of the basin. They are entirely buried with the exception of their west-facing walls, which are covered by a low architectural landscape wall. Other walls are configured to the natural contours of the landscape and offset to form a terraced landscape. Both fountain structures are removed.

Environmental Assessment

Table 4.2 presents a more detailed assessment of the Project construction and potential environmental impacts for the three basic concept design categories. Options 5 and 2 are not listed specifically in Table 4.2, however the environmental impacts and costs related to Option 5 are similar to those for Option 4 (the preferred option), while those for Option 3 are similar to those presented for Option 2.

Options 1, 2 and 3 are more costly, but preserve or reuse some of the site architecture, including fountain structures. The fountains however, would remain dry in order to be consistent with EBMUD's drought management and water conservation practices eliminating water features. The neighborhood in general was not interested in the idea of preserving the fountains if the water was turned off. Options 4 and 5 completely alter the site, incorporating the new buried water tanks into a natural landscape design. Based on public input and specific selection criteria, Option 4 was selected as the preferred plan given its more natural-looking and aesthetically pleasing design.

TABLE 4.2
Estates Reservoir Replacement
Alternatives of the Project

	Complete Alteration Category Option 4 Proposed Project [1,4] *(Similar Impacts for Option 5)*	**Preservation Category Option 1** [2, 4]	**Adaptive Reuse Category Option 2** [3,4] *(Similar Impacts for Option 3)*
Schedule and Cost	Two new buried tanks at Estates	Preserve Estates roof and fountains with new tanks underneath	Remove Estates roof structure and preserve one or more fountains with two new tanks underneath
Construction Schedule	2 years, demolition and replacement	3 years, associated with retrofit construction	3 years, associated with retrofit construction
Project Cost	$15 Million	$21 Million	$16 Million
Potential Environmental Impacts			
Visual Quality	Less Than Significant - With Mitigation	Less Than Significant - With Mitigation	Less Than Significant - With Mitigation
Geology, Soils, Seismicity	Less Than Significant - With Mitigation	Less Than Significant - With Mitigation	Less Than Significant - With Mitigation
Biological Resources	Less Than Significant - With Mitigation	Less Than Significant - With Mitigation	Less Than Significant - With Mitigation
Cultural Resources	Significant/Unavoidable -With Mitigation	Less Than Significant	Significant/Unavoidable -With Mitigation
Traffic and Circulation	Significant/Unavoidable -With Mitigation	Significant/Unavoidable -With Mitigation	Significant/Unavoidable -With Mitigation
Air Quality	Less Than Significant - With Mitigation	Less Than Significant - With Mitigation	Less Than Significant - With Mitigation
Greenhouse Gases and Climate Change	Less Than Significant - With Mitigation	Less Than Significant - With Mitigation	Less Than Significant - With Mitigation
Noise and Vibration	Significant/Unavoidable -With Mitigation	Less Than Significant - With Mitigation	Significant/Unavoidable -With Mitigation

Notes:
1. *Option 4 (Complete Alteration) described in the 2008 RHAA Concept Design Report (updated 2009)t; also the preferred landscape plan and alternative.*
2. *Option 1 (Preservation) described in the 2008 RHAA Concept Design Report (updated 2009).*
3. *Option 2 (Adaptive Re-Use) described in the 2008 RHAA Concept Design Report* (updated 2009).
4. *Dingee Reservoir will be removed from service once the replacement Estates Reservoirs are constructed and in service.*

Criteria for selection of the preferred alternative included: project cost and logistics, potential for recycle/reuse on-site, seismic stability, reduced truck/traffic and visual enhancement. Option 4 is the preferred alternative in this EIR as it minimizes construction, operating and visual impacts, and is also the most cost efficient with the shortest construction duration. Option 4 requires the least amount of imported fill, also minimizing traffic, air quality, greenhouses gases, and noise impacts. Views of the tanks from Estates Drive are all but eliminated by incorporating the buried tank design into the overall landscape plan. The process of lowering the existing embankment to provide on-site fill also opens up distant views towards the San Francisco Bay and removes Estates Dam from DSOD jurisdiction. Walking paths along Estates Drives will also be improved.

4.4 No Project Alternative

Description

Under the No Project Alternative, the proposed Project would not be implemented. None of the proposed facility improvements described in Chapter 2, Project Description, would occur. The storage and operational improvements needed in the Dingee and Piedmont Pressure Zones (noted in Chapter 2 and restated below) would not be constructed, and the dam would continue to violate DSOD requirements. This alternative would therefore not meet the Project purpose.

Environmental Assessment

If the Estates Reservoir Replacement Project were not implemented, none of the needs for the Project would be achieved, and none of the benefits associated with the Project would occur. The Estates Reservoir Replacement Project responds to a variety of needs, summarized as follows and detailed in Section 2.2 of Chapter 2:

- Resolve distribution system issues including poor water quality due to excess volume in the Estates and Dingee Reservoirs.
- Replace inefficient storage in the pressure zone with optimal sites from a hydraulic and cost perspective.
- Replace aging distribution facilities (storage and pumping) in the pressure zone.
- Address seismic deficiencies at the dam foundation, identified as a result of a review of Estates Dam, requested by DSOD.
- Maintain an acceptable aesthetic site environment given the existing roof architecture.

EBMUD is obligated to comply with water quality regulations and permit conditions, and to manage its distribution system facilities for optimal efficiency and cost effectiveness, with the ultimate goal of providing adequate water service to its customers. Consequently, if the Estates Reservoir Replacement Project were not implemented, EBMUD would have to implement other strategies to address these issues (where other strategies exist). Such strategies could include implementing some of the alternatives listed in this chapter, which were considered and rejected.

In the meantime, EBMUD would continue to operate the system as it does today. The current excess storage problem in the Dingee Pressure Zone (Estates and Dingee Reservoirs) would remain unresolved. Maintaining oversized facilities also diverts resources away from investment in other, necessary system wide improvements. Aging systems become increasingly inefficient and costly to operate and maintain, and could eventually pose safety hazards and impact water quality. The DSOD request for improvements to resolve dam foundation issues would be costly without guaranteeing permanent resolution of seismic/regulatory issues. DSOD would retain regulatory responsibility for the dam and by extension, the reservoir, and that oversight would in turn entail unspecified future expenditures to ensure on-going compliance.

4.5. Comparison of Selected Alternatives and Identification of the Environmentally Preferred Project

CEQA requires that an EIR identify an environmentally preferred alternative (Guidelines 15126.6 (e) (2).

The analysis presented in Chapter 3 of the EIR indicates that most of the impacts associated with the proposed Project (Alternative 2) are construction related and can be mitigated to a less than significant level. Exceptions include cultural resource impacts related to demolition of the Estates Reservoir roof and roof features, short-term construction-related noise impacts at the Project site, and short-term off-site traffic impacts on LaSalle Avenue, west of Trafalgar. Even with mitigation, these impacts would remain significant and unavoidable.

Alternative 2 is the preferred alternative, minimizing construction costs, and in turn, construction duration and related impacts, relative to the other alternatives. The preferred Project also optimizes the potential to reuse existing materials on site, thus minimizing impacts on traffic, air quality and greenhouse gas emissions.

In the near term, the No Project Alternative would avoid the construction related impacts associated with the proposed Project. However, the No Project Alternative would not address any of the Project needs or objectives as stated in Chapter 2 of this EIR or noted above which include environmental impacts to water quality and public safety from seismic hazards.

The proposed Project (Alternative 2) is the environmentally superior, feasible alternative since it involves construction at only one and not two or three reservoir sites. Also, the proposed Project would have a lower potential for impacts to traffic and circulation, air quality, GHG, noise, visual, geotechnical, and biological resources with one exception. Demolition of the Estates roof and features constitutes a permanent loss of facilities which constitutes a Significant and Unavoidable impact to Cultural Resources (even with mitigation).

References

EBMUD, July 2009, Facilities Improvement Plan for the Dingee and Piedmont Pressure Zone Improvements.

EBMUD- June 2005, Pressure Zone Planning Study for Central Oakland Hills Cascade Pressure Zones.

Royston, Hanamoto, Alley and Abey, 2008 (updated 2009) - Estates Reservoir Concept Design Process and Recommendations

CHAPTER 5
Cumulative Impacts, Growth Inducement and Other Topics Required by CEQA

5.1 Cumulative Impacts

5.1.1 Approach to Analysis

A cumulative impact is caused by implementation of the proposed Estates Reservoir Replacement Project (Project) evaluated in an Environmental Impact Report (EIR) together with other projects with related environmental effects. The purpose of this analysis is to disclose the potential for significant cumulative impacts resulting from the Project in combination with other projects or conditions, and to indicate the severity of the impacts and their likelihood of occurrence.

The California Environmental Quality Act (CEQA) Guidelines (Section 15130) require that EIRs discuss the cumulative impacts of a project when the Project's incremental effect is "cumulatively considerable," meaning that the Project's incremental effects are considerable when viewed in connection with the effects of past, current, and probable future projects. The discussion of cumulative impacts should include:

- Either 1) a list of past, present, and probable future projects producing related or cumulative impacts; or 2) a summary of projections contained in an adopted general plan or similar document, or in an adopted or certified environmental document, which described or evaluated conditions contributing to a cumulative impact
- A discussion of the geographic scope of the area affected by the cumulative effect
- A summary of expected environmental effects to be produced by these projects
- Reasonable, feasible options for mitigating or avoiding the Project's contribution to any significant cumulative effects

This cumulative impact analysis uses a list of probable future projects under the purview of various agencies with jurisdiction in the Project area, including other East Bay Municipal Utility District (EBMUD) projects. The analysis does not address cumulative impacts for resource issues not analyzed for the Project, i.e., for issues not found to be potentially significant and therefore excluded from analysis in the EIR. Issues excluded include: Land-Use/Planning; Hazard/Hazardous Materials; Public Services; Utilities/Service Systems; Agricultural Resources; Recreation; Population and Housing.

5.1.2 Projects with Potentially Related or Cumulative Effects

This evaluation considers cumulative impacts associated with construction and operation of the proposed Project based on the geographic scope of the affected environmental resource and the proposed Project schedule. The cumulative analysis considers the impacts of the Project described in Chapter 3 in combination with potential environmental effects of other projects proposed for the Project area.

The project sponsors contacted for this chapter include service districts (PG&E), local jurisdictions (Cities of Oakland and Piedmont), responsible and other agencies (California Department of Transportation [Caltrans] and Alameda-Contra Costa [AC] Transit). Proposed EBMUD projects are also considered. Projects were generally identified by the planning, community development, and public works/engineering departments of these agencies, as well as through information posted on websites. Projects with a potential for cumulative impact within the proposed construction time frame are assumed to be those within a one to three mile radius of the Estates Reservoir site. The complete list of projects provided by jurisdiction and agencies is available for reference upon request.

The City of Oakland provided a table of 96 proposed projects, of which 29 are projects for which a pre-application hearing has been held and 67 are projects that have been approved. A list of 65 completed projects was also provided. Using a one, two and three mile radius to determine potential cumulative significance relative to geographic proximity, only two proposed projects are in close proximity to the reservoir site and therefore have a potential for cumulative impact relative to traffic and circulation (travel time, access and haul routes to/from the reservoir site). The City subsequently indicated that one of those projects was indefinitely deferred due to a lack of financing.

The City of Piedmont mentioned three potential projects that were being considered of which two are planning studies, but noted that there is no established schedule or funding to implement any project. No detail was provided for these projects.

Caltrans provided a list of six potential projects. Four are projects that will be dispersed throughout Alameda County with no specific locations provided. Addition of a fourth bore to the Caldecott Tunnel North side, and storm drain improvements along the Warren Freeway (SR-13) between Redwood Road to Carson Street, would be within the three mile radius.

A review of AC Transit's website showed dispersed small scale improvement projects in Oakland and Alameda County along major arterials in the flatland/downtown area. None are within the three miles radius of the Estates reservoir site.

The EBMUD Capital Improvements Program (lists 75 projects scheduled for construction in the 2011-2029 time frame. Eleven fall within the three mile radius of the Project site, the defined area of potential impact.

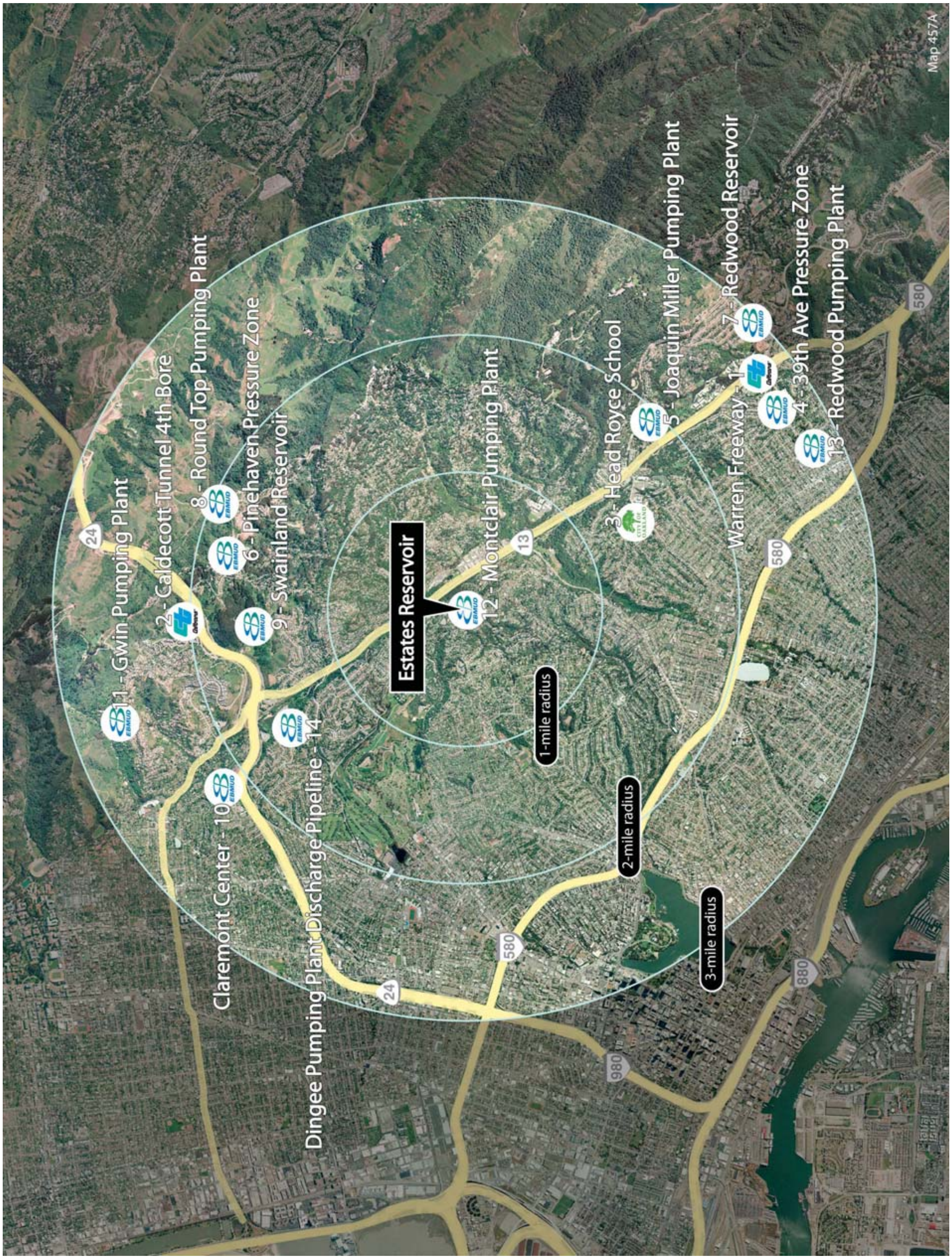
Table 5-1 lists projects within the three mile radius of the Estates Reservoir site, and **Figure 5-1** shows their approximate location. Projects included in the table and figure include; 11 EBMUD projects, 2 Caltrans projects and 1 City of Oakland project. Projects are described in terms of location, description, status, and construction schedule (where known). In general, for future projects, construction schedules are broadly estimated and subject to change; therefore, the cumulative analysis is based on the conservative assumption that construction activities could occur within a three-year window of the proposed project's construction schedule. Given the existing local, statewide and national economic recession and financial crisis, there is even greater uncertainty about construction schedules for all projects listed.

It is important to note that for a group of projects to generate cumulative impacts, they must be spatially and temporally proximate. Only one of the fourteen projects identified in **Table 5.1** is located within a one mile radius of the Estates Reservoir site (upgrade of the Montclair Pumping Plant, located on the Estates Reservoir site). Eight projects are located within a two mile radius of the Project site and five projects are located within a three mile radius.

Prior to construction of the Project, EBMUD will develop detailed scheduling guidelines for planned and proposed EBMUD activities in the vicinity of the Project site, to minimize disruption near the reservoir site. EBMUD will also coordinate with the appropriate departments of local jurisdictions in Oakland and Piedmont and with other utility districts and agencies regarding the timing of other construction projects that would occur near the Project site. Such coordination would help to minimize multiple construction disruptions to the same area, at the same time.

TABLE 5-1
Projects with the Potential for Cumulative Impacts
(Estates Reservoir Replacement – Construction Schedule, 2011-2013)

Number	Agency	Project Name	Project Description/Location	Project Schedule/Status	Source
1	CALTRANS	Warren Freeway Storm Water Mitigation	Warren Freeway, from Redwood Road to Carson Street Repair 5.0-5.5 miles of drains	2011-2013	CALTRANS - 8/2008
2	CALTRANS	Caldecott Tunnel Fourth Bore	Add a fourth bore to the Caldecott Tunnel on Highway 24, North side	2011-2013	CALTRANS - 2008
3	City of Oakland	Head Royce School	4314 Lincoln Avenue Master Plan Development.	Completed	Oakland Planning Department - 10/2008
4	EBMUD	39th Ave, Pressure Zone Improvements	4290 Maybelle Reservoir and Pumping Plant Improvements	2011-2013	EBMUD – 12/2008
5	EBMUD	Joaquin Miller Pumping Plant	3213 Burdeck Drive Pumping Plant Improvements	2015	EBMUD - 12/2008
6	EBMUD	Pinehaven Pressure Zone Improvements (PZI)	6039 Grizzly Peak Boulevard Decommission Reservoir and Pumping Plant	2015-2016	EBMUD - 12/2008
7	EBMUD	Redwood Reservoir	4392 Terrabella Way Decommission Reservoir	2015	EBMUD – 12/2008
8	EBMUD	Round Top Pumping Plant	Selby Regional park Decommission Pumping Plant	2015	EBMUD - 12/2008
9	EBMUD	Swainland Reservoir	6275 Fairlane Drive Decommission Reservoir	2013-2014	EBMUD - 12/2008
10	EBMUD	Claremont Center	Golden Gate Ave at Chabot Road Aqueduct Repair	2011-2014	EBMUD - 12/2008
11	EBMUD	Gwin Pumping Plant	6 Strathmoor Drive Rehabilitate Pumping Plant	2014-2015	EBMUD - 12/2008
12	EBMUD	Montclair Pumping Plant	6317 Estates Drive Rehabilitate Pumping Plant	2013-2014	EBMUD - 12/2008
13	EBMUD	Redwood Pumping Plant	3851 39th Avenue Rehabilitate Pumping Plant	2014-2017	EBMUD - 12/2008
14	EBMUD	Dingee Pumping Plant Discharge Pipeline	From Claremont Center along Golden Gate to Broadway segment (Estates Reservoir end-point). Replace Pipeline	2011-2013	EBMUD - 4/2009



Source: EBMUD 2008

Projects with the Potential for Cumulative Impacts
Figure 5-1

5.2 Cumulative Impacts and Mitigation Measures

As shown in **Table 5.1** and **Figure 5-1**, a total of fourteen projects have been identified within a one, two and three mile radius of the Estates Reservoir site, with the potential to contribute to cumulative impacts. Seven are projects identified south of the Project site and seven are projects north of the Project site.

As noted before, the timing of many of the Project s listed is uncertain, and given the current financial crisis being experienced locally, statewide and nationally, deferral of construction schedules is likely.

Cumulative impacts are discussed below by resource area. Due to the generalized level of information on the Project s listed in **Table 5.1** (and the lack of response from other utilities) discussions are qualitative in nature. A discussion of the secondary effects of growth potentially induced by the Project, are included later in this Chapter.

Visual

Impact C-1: Cumulative short- and long-term visual impacts.

The geographic scope of this impact area is the general vicinity of the Estates Reservoir site and the viewsheds for adjacent/nearby residents.

As described in Chapter 3, mitigation measures would be employed to reduce short- and long-term visual effects of the reservoir improvement project to an less than significant level, through managing construction debris on site to maintain a clean, clear area and installing a cohesive, low maintenance landscape plan that creates an open-space, park-like setting in conjunction with interesting architectural detail in walls, drainage features, perimeter fencing and parking areas. No significant visual impacts are associated with the pumping plant upgrade since all work is proposed within the existing structure.

As noted in **Figure 5.1**, no other projects are known to be proposed in the immediate area or vicinity during the Estates Reservoir construction period. EBMUD will develop detailed scheduling and phasing guidelines to minimize short-term visual impacts to the surrounding area during construction of the Estates Reservoir Replacement and Montclair Pumping Pump Upgrade.

In addition, the reservoir site is screened from many surrounding vantage points by intervening topography and mature vegetation. Consequently, the likelihood of any cumulative adverse visual effects on local viewsheds during construction would be low.

Geology

Impact C-2: Cumulative geologic and seismic hazards.

The geographic scope of this impact area is the immediate embankment and soils within the reservoir site because none of the other listed projects is in close enough proximity to the Project site to generate additional hazards to people and structures in the Project Area.

As described in Chapter 3, the proposed Project could create areas with unstable slopes, expose soils to erosion and loss of topsoil during construction activities, and cause subsidence of native soils underneath stockpiled materials. However, these impacts are short-term and would be mitigated to a less-than significant level with the implementation of identified measures.

Since none of the Projects shown in **Table 5-1** are located within the area of potential impact, there would be no significant cumulative geologic or seismic impacts.

Biological Resources

Impact C-3: Cumulative loss of habitat for special-status wildlife and plants.

The geographic scope of this resource area is the Estates Reservoir site.

Two potentially significant short-term impacts to biological resources have been identified for this Project: loss of or damage to protected trees and disturbances to nesting raptors or special status nesting birds. Proposed mitigation measures described in Chapter 3 would reduce these impacts to a less than significant level. Disturbed areas would be revegetated and disturbances to nesting species will be avoided or buffered.

As noted in **Table 5.1**, the project s listed in proximity to the Project site are infrastructure improvement projects, located on already developed sites or in urban areas. Therefore, the proposed Project would not contribute to significant cumulative impacts to biological resources.

Cultural Resources

Impact C-4: Cumulative increase in cultural resources impacts.

The geographic scope of this resource area is the Estates Reservoir site, and the City of Oakland, with secondary reference to Alameda County and the State of California.

As described in Chapter 3, the Project would permanently eliminate a historic resource recommended for California Register of Historical Resources (CRHR) listing, and would have a significant, unavoidable and long-term impact to cultural resources even after mitigation (recording and documenting the roof and features). Therefore the Project

would contribute to cumulative cultural resources impacts for the City of Oakland specifically, and for Alameda County and the State of California, secondarily.

The potential for impacts to prehistoric or archeological resources or to unearth human remains exists and is mitigated to a less than significant level by applying standard contingency procedures. Consequently, the Project's incremental impact here is not cumulatively significant.

Traffic and Circulation

Impact C-5: Cumulative traffic and roadway disruptions.

The geographic scope of potential cumulative traffic impacts includes access routes to area freeways, and arterial and collector roadways used for haul routes and construction equipment/vehicle access to the Estates Reservoir site. All of the Project s listed in **Table 5.1** could affect traffic and circulation on States Routes 24 and 13, and Interstate 580.

As described in Chapter 3, the proposed Project would result in short-term increases in: vehicle trips by trucks and construction workers, traffic on area-wide roads, traffic hazards at specific points along Estates Drive, a demand for parking spaces for construction employees, and wear-and-tear on designated haul routes. More critically, the Project would also exacerbate existing deficiencies at the Moraga/SR 13/Estates Drive and La Salle/Moraga Avenue/Mountain Boulevard intersections. While most traffic and circulation Project impacts would be reduced to a less than significant level with implementation of proposed mitigation measures, impacts to the La Salle/Moraga Avenue/Mountain Boulevard intersection would remain significant even with mitigation since that intersection is presently at LOS F.

As shown in **Figure 5.1**, the potential for potential cumulative traffic impacts as a result of known projects is remote to non-existent since, with the exception of the Montclair Pumping Plant Upgrade, which is part of the proposed Project, as known projects are not located in proximity of the site. However, there could be a significant cumulative effect associated with the projects listed in **Table 5.1** for State Routes 24 and 13, and Interstate 580.

Prior to construction, EBMUD would coordinate with the appropriate departments of the surrounding jurisdictions and with other utility districts and agencies regarding the timing of construction projects that would occur near the Estates Reservoir site. Such coordination would help to minimize multiple disruptions in the same areas. EBMUD would also submit plans related to, and comply with the requirements of, encroachment permits with local jurisdictions, which would provide further opportunities to coordinate multiple projects. Specific measures to mitigate significant impacts would be determined as part of the interagency coordination. Upon completion of the Project, traffic generated by site construction activity would return to current levels, and the cumulative traffic impact is considered less than significant.

Air Quality

Impact C-6: Cumulative construction emissions.

The geographic scope of this resource area is the San Francisco Bay Area Air Basin. The Project would result in temporary increases in criteria air pollutant emissions during construction as well as potential exposure of sensitive receptors to diesel engine exhaust emissions from construction equipment and haul trucks. However, implementation of mitigation measures, as developed by the Bay Area Air Quality Management District and the California Air Resources Board, would mitigate the Project's contribution to regional air quality impacts. Therefore, the Project's contribution to cumulative air quality impacts would be negligible.

Other projects listed in **Table 5-1** also have the potential to result in the same types of air quality impacts as the Estates Reservoir Project, with the extent of impact depending on individual project characteristics. However, all planned and proposed projects in the region are subject to BAAQMD regulations and the Clean Air Plan guidelines. Therefore, assuming implementation of appropriate mitigation measures for all projects in the region, cumulative air quality impacts would be less than significant.

Greenhouse Gases (GHG)

The geographic scope of this resource area is the San Francisco Bay Area Air Basin and the Earth.

As discussed in Chapter 3, the Project would not impede the State's ability to meet its 2020 greenhouse gas emissions goal. Implementation of specific measures to reduce GHG from fuel combustion, in addition to diesel exhaust control measures (Air Quality) would reduce and sequester GHG associated with vehicle and equipment use. On going maintenance activities would remain the same, and permanently eliminating water use by the fountains would also save water and electricity used to operate the fountain pumps. For these reasons, the Project would result in less than significant cumulative impacts on global climate change.

Noise and Vibration

Impact C-7: Cumulative construction noise and vibration impacts.

The geographic scope of this impact area is the extent of sensitive receptors within a few hundred feet of the Project's staging areas/construction site.

The Project would result in intermittent and temporary noise above existing ambient noise levels due to construction activities in the Project vicinity. With implementation of mitigation measures, outlined in Chapter 3, the Project's short-term noise impacts would be less than significant, although possibly still periodically and intermittently noticeable

at the closest noise-sensitive receptors across Estates Drive, and adjacent to the reservoir site. While there is a remote potential for the proposed Project to contribute to construction noise levels generated by the cumulative projects listed in **Table 5-1**, the distant location of projects and uncertain construction timing suggests that the potential for cumulative noise impacts would be remote to non-existent.

As previously described, EBMUD will coordinate with the appropriate departments of the neighboring jurisdictions and with other utility districts and agencies regarding the schedule and timing of construction projects that would occur near the Estates Reservoir site. With early and ongoing coordination, EBMUD would avoid conflicts with other projects to the extent possible, and the Project's contribution to cumulative construction noise impacts, as mitigated, would not be considered significant.

Similarly, while excavation activities for the Project could generate perceptible vibration levels, implementation of mitigation measures (3.9-3) would reduce those impacts to a less than significant level. The distant location of other projects and uncertain construction timing suggests that the potential for cumulative vibration impacts would be remote to non-existent.

5.3 Growth Inducement Potential and Secondary Effects of Growth

The CEQA Guidelines require that an EIR evaluate the growth-inducing impacts of a proposed action. A growth inducing impact is defined as follows:

> "The ways in which the proposed project could foster economic or population growth, or the construction of additional housing, either directly or indirectly, in the surrounding environment. Included in this are [public works] projects which would remove obstacles to population growth.... It must not be assumed that growth in any area is necessarily beneficial, detrimental, or of little significance to the environment." (Section 15126.2(d.)

The environmental effects of a proposed project's induced growth are secondary or indirect impacts. Secondary effects of growth can result in significant increased demand on community and public service infrastructure; increased traffic and noise; degradation of air and water quality; and conversion of agricultural land to urban uses.

Growth-inducing effects can result from projects that remove obstacles to population growth. Increases in population can tax existing community service facilities, requiring construction of new facilities that could cause significant environmental effects. The CEQA Guidelines require analysis of the characteristics of projects that may encourage or facilitate other activities that could in turn significantly affect the environment, either individually or cumulatively. The CEQA Guidelines also encourage analysis of housing impacts, including displacement of substantial numbers of existing housing or people, necessitating the construction of replacement housing elsewhere.

Based on the CEQA definition above, assessing the growth-inducement potential of the Estates Reservoir Replacement Project involves answering the question: Will construction and/or operation of planned improvements remove an obstacle to growth and thus directly or indirectly support more economic or population growth or residential construction?

The purpose of the Estates Reservoir Replacement Project is to improve water quality by downsizing storage volume and restoring operational flexibility and redundancy in the Dingee Pressure Zone, including eliminating storage at the Dingee Reservoir and reducing the total storage complement at the Estates Reservoir by more than 50 percent of its existing capacity. Proposed improvements will also address seismic issues related to the reservoir embankment in response to a 2004 letter request by the Division of Safety of Dams (DSOD) for seismic study and remediation of the Estates Dam.

Implementation of the proposed Project would allow EBMUD to continue to provide quality water service to existing customers in the Dingee Pressure Zone and to eliminate potential seismic hazards associated with the existing reservoir. This Project's purpose and the implementation of the proposed Project have no potential to directly or indirectly foster population growth or to result in the construction of additional housing.

The Project would contribute to local economic growth from construction expenditures for labor and materials. Construction contracts will go to bid in 2010, and it is expected that firms that bid will rely on a construction labor force already present within commute distance to the site. Additional housing will not be constructed in the Project vicinity for the maximum 50 on-site workers. These workers may purchase goods and services locally; however, nearby retail services are provided at the Montclair Village within proximity of the site.

5.4 Other Topics Required by CEQA

5.4.1 Population and Housing

Construction activities would occur on EBMUD property, and no housing exists on the Project site. The proposed replacement of Estates Reservoir would continue to serve the same existing customers within the Dingee Pressure Zone. Since the proposed Project would not induce any population growth, displace substantial numbers of existing housing, or displace substantial numbers of people, there would be no impact to population and housing.

5.4.2 Significant Irreversible Environmental Changes

Section 15126.2(c) of the CEQA Guidelines states the following:

> Uses of nonrenewable resources during the initial and continued phases of the Project may be irreversible since a large commitment of such resources makes

> removal or nonuse thereafter unlikely. Primary impacts and, particularly, secondary impacts (such as highway improvement which provides access to a previously inaccessible area) generally commit future generations to similar uses. Also, irreversible damage can result from environmental accidents associated with the Project. Irretrievable commitments of resources should be evaluated to assure that such current consumption is justified.

Construction of the Project facilities would result in an irretrievable and irreversible commitment of natural resources through the direct consumption of fossil fuels and use of materials. That commitment of resources would substantially end when the replacement reservoirs are constructed. Implementation of the Project would not alter land uses, nor commit future generations to undesirable uses.

CHAPTER 6
Report Preparers

6.1 Lead Agency

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APPENDIX A
Public Involvement

Public Review under CEQA

Public involvement is an essential feature of the California Environmental Quality Act (CEQA) process. The CEQA environmental review process has greatly expanded the opportunities for interested citizens to participate in project planning and government decision-making. CEQA encourages public involvement as early as possible in the Project planning phase. The Environmental Impact Report (EIR) is a well-established tool to inform and influence the outcome of a broad variety of projects, including the proposed EBMUD Estates Reservoir Replacement Project. EBMUD's outreach efforts for the Project, described below, exceed CEQA requirements.

Public Involvement for the Project

EBMUD has provided and will continue to provide opportunities for the public to participate in the CEQA process through meetings, public notices on and public review of the Draft EIR, additional public meetings, and preparation of the Final EIR. A summary of the public involvement process to date is provided below.

EBMUD held a total of five community meetings in Oakland to involve the public in the Estates Reservoir Replacement Project, prior to initiating preparation of the EIR. Community meeting dates and locations were:

1.	September 19, 2007	Estates Reservoir site, 6317 Estates Drive
2.	October 17, 2007	Montclair Elementary School, 1757 Mountain Boulevard.
3.	March 13, 2008	Montera Junior High School, 555 Ascot Drive.
4.	May 8, 2008	Montera Junior High School, 555 Ascot Drive.
5.	June 25, 2008	Joaquin Miller Community Center, 3594 Sanborn Drive.

The two meetings in 2007 presented the replacement storage alternatives being considered, and solicited community input regarding the proposal in general. EBMUD then scheduled additional meetings led by RHAA aimed at soliciting design and other input from the community, developing and presenting design alternatives for discussion and further refinement, and finally presenting the selected concept design alternative. The process of developing the concept design is documented in the Estates Reservoir Concept Design Process and Recommendations Report, 2008 (updated 2009), available for reference on EBMUD's web site (www.ebmud.com) or at EBMUD offices. EBMUD also posted an information page for the Estates Reservoir Replacement Project on its website.

EIR Process

EBMUD held an agency informational meeting for the Notice of Preparation for the Estates Reservoir Replacement EIR at the EBMUD Administration Center and Business Office in Oakland on August 27, 2008.

Once the Draft EIR is completed, and in conjunction with circulating the Notices of Availability and Draft EIRs to agencies, community residents and interested parties, the Draft EIR will be posted on EBMUD's website, to optimize opportunities for public review.

EBMUD has attempted in good faith to involve the public in reviewing and commenting on the proposed Project. At each stage of the environmental review process, EBMUD has invited (and continues to invite) the public to provide input. EBMUD welcomes and encourages comments concerning the Project and respects the input that members of the community have to offer.

APPENDIX B

Notice of Preparation

AUGUST 2008

NOTICE OF PREPARATION
ENVIRONMENTAL IMPACT REPORT
ESTATES RESERVOIR REPLACEMENT PROJECT
EAST BAY MUNICIPAL UTILITY DISTRICT
AUGUST 13, 2008

Project: The East Bay Municipal Utility District (EBMUD) proposes to prepare a project level Environmental Impact Report (EIR) for the replacement of Estates Reservoir and the rehabilitation of the Montclair Pumping Plant, both located at 6317 Estates Drive in the City of Oakland. The project involves the demolition of the existing reservoir structure and appurtenances (including the roof system, roof features, and concrete lining) and the installation of two 2.75 million gallon buried concrete tanks, landscaping and associated appurtenances. The Montclair Pumping Plant element includes an upgrade of exiting pumps and motors including the instrumentation, motor control centers, transformers and related appurtenances located at the facility. See attached location map.

Objective: The project objectives are to improve water quality by downsizing existing open-cut reservoirs and to restore operational flexibility and redundancy in the greater Dingee Pressure Zone. The improvements will also address seismic issues related to the reservoir embankments.

Project Location/Setting: Estates Reservoir is located on a 6.7-acre parcel of land on the south side of Estates Drive in the City of Oakland. The reservoir is situated west of Highway 13, south of Moraga Road and north of Park Avenue. Pine, coastal live oak trees, coastal redwoods, deodara cedars and shrubbery are interspersed along the property boundary.

EIR Process: EBMUD, acting as lead agency under the California Environmental Quality Act (CEQA), will prepare an EIR consistent with CEQA. With this Notice of Preparation (NOP), input regarding the scope of the environmental review in the EIR is being solicited from interested parties, including responsible, resource and trustee agencies and the public. Responsible, resource and trustee agencies under CEQA and other interested agencies may include the City of Oakland, Alameda County, Regional Water Quality Control Board, Bay Area Air Quality Management District and the State of California Division of Safety of Dams.

The environmental factors that could potentially be affected by this project (i.e., involving at least one impact that is a "Potentially Significant Impact") include aesthetics, cultural resources, noise, air quality, geology/soils and transportation/traffic. Additional elements may be added to this list as a result of scoping.

EBMUD requests your input regarding the scope and content of the environmental information that should be considered or included in the proposed EIR. CEQA requires that your response be submitted to EBMUD at the earliest possible date, but no later than September 15, 2008.

Scoping Meeting: A scoping meeting for agencies will be held on Wednesday, August 27, 2008, from 10:00 a.m. to 12:00 noon, at the EBMUD Administration Building, 375 11th Street, 2nd Floor, Training Resource Center/Small Room, Oakland, California.

Responses to or questions regarding this NOP should be directed to:

Gwen Alie, Associate Planner
East Bay Municipal Utility District
375 Eleventh Street, MS 701
Oakland, CA 94607-4240
(510) 287-1053, galie@ebmud.com

The Draft EIR is targeted for circulation in February 2009, with action by EBMUD's Board of Directors anticipated in July 2009. Notice will be given of public meetings, including a public hearing during the Draft EIR comment period. At the end of the review and comment process, EBMUD's Board of Directors will determine whether to adopt the Estates Reservoir Replacement Project and certify the EIR. Additional information about the Estates Reservoir Replacement Project can also be obtained from the EBMUD website.

Xavier J. Irias, Director of Engineering and Construction
East Bay Municipal Utility District

8-13-08
Date

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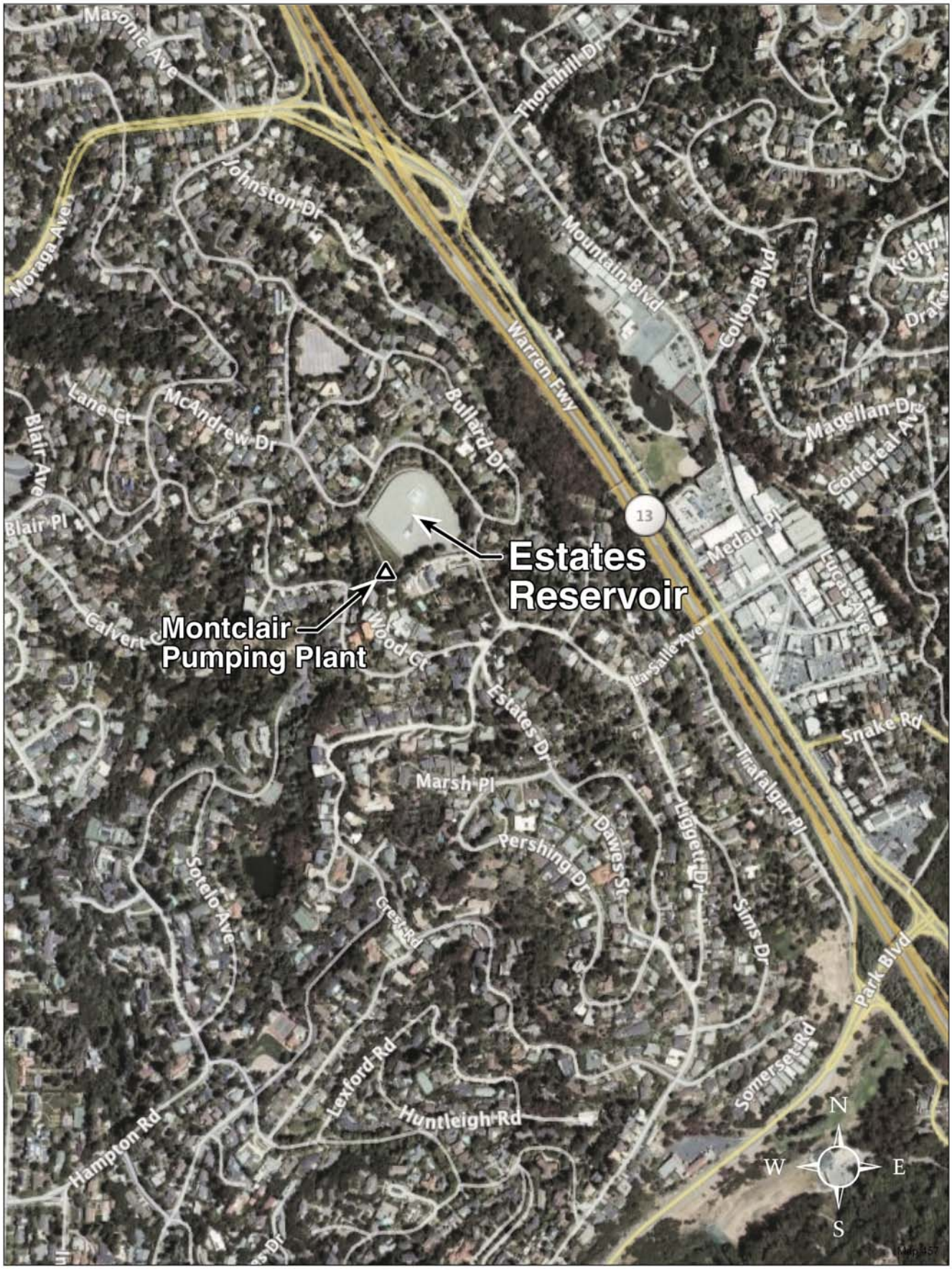

Estates Reservoir Replacement Vicinity/Location Map

APPENDIX C

Initial Study

Initial Study

Dingee Pressure Zone Improvement Project
Estates Reservoir Replacement Project
Water Distribution Facilities

2008 (Revised 2009)

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1. Summary

1.1 Introduction

Section 15603 of the Guidelines for Implementation of the California Environmental Quality Act (CEQA) requires a Lead Agency to conduct an Initial Study to determine if a project may have significant environmental effects. The purposes of an Initial Study are: a) to provide the Lead Agency with information to use as the basis for determining the appropriate CEQA documentation; b) to enable the Lead Agency to modify a project and/or incorporate measures; and c) to assist in the preparation of an Environmental Impact Report (EIR), if required, by focusing the scope of potential impacts to be addressed (CEQA Guidelines Sections 15163 (c)).

This Initial Study provides a preliminary assessment of the environmental effects associated with the planning, design and construction of water storage and pumping plant storage in East Bay Municipal Utility District's (EBMUD) the Dingee Pressure Zone that serves the Oakland/Piedmont area.

1.2 Project Overview

Dingee Pressure Zone has distribution system issues that are being addressed as part of the greater Central Oakland Hills Cascade (COHC) Pressure Zone Improvement project designed to improve water quality and increase system reliability (and operating efficiency) by removing excess or inefficient storage and aging facilities requiring major rehabilitation or replacement. Figure 1 identifies the 15 pressure zones in the cascade and also the proposed Estates and Dingee Reservoir Projects documented herein, located in the northern portion of the cascade, just east of Piedmont. Figure 2 shows the close proximity of the Dingee and Estates Reservoir sites, both located in Oakland.

1.3 Project Summary

The Dingee Pressure Zone Improvements are discussed below.

Estates Reservoir –

- Demolish and remove the existing open-cut reservoir roof and lining system and install two new 3.3-million gallon (MG) tanks within the existing basin.
- Install or refurbish the existing drain line and connect it into the existing site drainage system. See Figure 3.
- Upgrade existing equipment within the existing Montclair Pumping Plant, at the Estates Reservoir site

Dingee Reservoir –

- Drain the reservoir and remove from service, once improvements at Estates Reservoir have been completed. See Figure 4.

1.4 Project Purpose

Principal storage in the Dingee Pressure Zone is contained in Dingee and Estates Reservoirs with a service elevation between 500 feet and 675 feet; both reservoirs are located in the City of Oakland.

The proposed improvements addresses water quality, system reliability and seismic safety issues(dam embankments) with a cost effective solution that responds to and enhances site aesthetics.

Poor water quality occurs in the Dingee Pressure Zone due to the large storage volume versus low water demands which results in water aging combined with the disinfectant dissipating. This poor water quality is also experienced in the 11 pressure zones located above Dingee Pressure Zone as a result of continued water aging. Removal of excess water storage within Dingee Pressure Zone by downsizing the reservoirs will improve water quality within and above the Dingee Pressure Zone.

Estates Reservoir embankment does not meet the State of California Division of Safety of Dams' (DSOD) recommended seismic requirements. As a result, the 17.6-MG Estates Reservoir is operating at a reduced capacity of about 13.4 MG. Dingee Reservoir is not under DSOD jurisdiction but will require a new roof and lining improvements in several years. In addition, the existing roof structures of Estates and Dingee Reservoirs do not meet current seismic standards.

2. Project Characteristics

2.1 Regional Setting

Dingee and Estates Reservoirs are both located in Oakland Hills west of Highway 13 and south of Moraga Avenue and northwest of Park Boulevard. The reservoirs are located within one-quarter of a mile from each other and can be accessed from Highway 13 via the Moraga Avenue or Park Boulevard exits (see Figure 2). The sites can also be accessed from the west via Oakland Avenue (Oakland Avenue to Highland Way to Blair Avenue). The Hayward Fault zone lies approximately 1,000 feet to the east of Estates Reservoir and approximately 2,500 feet to the East of Dingee Reservoir.

2.2 Site Location

Estates Reservoir and the Montclair Pumping Plant are located at 6317 Estates Drive in Oakland. Dingee Reservoir is located at the intersection of Estates Drive and Bullard Drive, in Oakland.

2.3 Environmental Settings

Estates Reservoir is located on a 6.7 acre parcel of land, Figure 5. The reservoir itself is situated on the western slope of the Oakland Hills west of Highway 13. The view to the southwest overlooks the San Francisco Bay. The eastern portion of the ridgeline rises approximately 40 feet above the reservoirs. About a dozen residences overlook or see the top of the reservoir. Numerous pine trees, eucalyptus trees, and shrubbery line Estates Drive, thus shielding the reservoir roof from the adjacent neighbors. Redwood trees creating a park-like setting are located beneath the reservoir embankment which is located on the western portion of the property.

The Montclair Pumping Plant is located on the Estates dam embankment (Figure 5).

Dingee Reservoir is located on a 2.1 acre parcel of land, Figure 6. The reservoir is situated atop a shallow sloped plateau along the western slope of Oakland Hills west of Highway 13. The view to the west overlooks the San Francisco Bay. The north easterly portion of the ridgeline rises approximately 60 feet above the reservoirs. About 10 residences overlook the setting of the reservoir. Pine trees, coastal live oaks, deodar cedars, and shrubbery are interspersed along the property boundary.

2.4 Description of Existing Facility

Estates Reservoir - The reservoir was originally constructed in 1903 and raised to its present height in 1938. The reservoir was formed by excavating a basin at the head of a small ravine into the existing bedrock and constructing an earth fill dam at the west side. A concrete liner and roof was installed in 1968. The roof system is supported by

concrete columns and timber frames. Architectural elements were incorporated into the roof that includes terraces, two large water fountains and one planter box.

Montclair Pumping Plant – The 5.4 million gallons per day capacity pumping plant was originally constructed in 1936, and upgraded in 1998 as part of EBMUD's Seismic Improvement Program. The Plant is located about 180 feet from the Wood Drive pedestrian gate entrance and 540 feet from the vehicle entrance on Estates Drive.

Dingee Reservoir - The reservoir was originally constructed in 1894 and was modified twice, once for the construction of a new roof and lining (1931), and again for the construction a new curb which now parallels Estates Drive (1939). The dam consists of fill, and cut into existing bed-rock material. No other major improvements have been performed since 1939.

3. Project Description

3.1 Estates Reservoir

The existing Estates Reservoir roof and lining system will be demolished. Existing structural elements such as the pre-cast concrete columns, floor panels and glulam girders will be recycled where feasible, and incorporated into the grading and landscape plan for the site and replacement tanks.

The proposed replacement project consists of two partially buried concrete tanks. The tanks will be designed to be the same size (two at 3.3 MG each) for symmetry, expeditious design and construction, and operational purposes. Overflow and bottom elevation of both tanks will be 770 feet and 738 feet, respectively, to maintain the same level of service within the Dingee Pressure Zone. Each tank will be 138 feet in diameter and approximately 35 feet in height. Tanks will be located on the eastern end of the reservoir basin, set into the slope, and will be entirely buried with the exception of the west facing walls which will be covered by a serpentine architectural wall. The existing Estates Dam embankment will be lowered by approximately 25 feet, and excavated materials will be used to backfill the tanks. A vault area with valve pit and a small parking area with turnaround for maintenance vehicles and equipment will also be located in the basin.

An integrated landscape plan for the site includes planting the tank top and upper basin slopes with a mixture of native grasses and wildflowers, with the bottom of the basin planted with native trees and grasses. The proposed design layout minimizes and improves views of the replacement tanks and site from Estates Drive by replacing an existing “hardscape” view of terraced tar and gravel roofs with a comprehensive, “open-space” vegetation plan, with a distinctive architectural element (wall).

Design duration will last one year and commence in early 2010. Construction duration will last approximately 2 years and commence in 2012.

3.2 Montclair Pumping Plant

Improvements at the Montclair Pumping Plant include upgrades of the existing pumps, motors and related appurtenances located within the structure. No additional pumping plant capacity is required.

3.3 Dingee Reservoir

The existing Dingee Reservoir will be drained and removed from service once improvements at the Estates Reservoir site have been completed.

ENVIRONMENTAL CHECKLIST FORM

1. Project Title: Estates Reservoir Replacement

2. Lead Agency Name and Address: East Bay Municipal Utility District
   Water Distribution Planning Division -MS 701
   375 11th Street
   Oakland, CA 94607

3. Contact Person: Gwendolyn A. Alie, Associate Planner

4. Project Location:
   4.1. Estates Reservoir is located at 6317 Estates Drive, Oakland
   4.2. Dingee Reservoir is located at the intersection of Estates Drive and Bullard Drive, Oakland

5. Project Sponsor's Name and Address: East Bay Municipal Utility District
   Water Distribution Planning Division -MS 701
   375 11th Street
   Oakland, CA 94607

6. General Plan Designation:
   Estates Reservoir Hillside Residential
   Dingee Reservoir Hillside Residential

7. Zoning:
   Estates Reservoir: R-30 (single family residential)
   Dingee Reservoir: R-30 (single family residential)

8. Description of Project *(Describe the whole action involved, including, but not limited to later phases of the project, and any secondary, support, or off-site features necessary for its implementation. Attach additional sheets if necessary.)*

   Refer to Section 1.2 Project Overview and 1.3 Project Summary, page 1

9. Surrounding land uses and setting *(briefly describe project's surroundings)*:
   Estates Reservoir: R-30 (single family residential)
   Dingee Reservoir: R-30 (single family residential)

10. Other public agencies whose approval is required *(e.g., permits, financing approval, or participation agreement)*:

    1. Regional Water Quality Control Board: Storm Water Pollution Prevention Permit
    2. Division of Safety of Dams: review and approval of plans for modifying the Estates Dam
    3. California Air Resources Board: registration of portable engines, air compressors and generators

ENVIRONMENTAL FACTORS POTENTIALLY AFFECTED:

The environmental factors checked below would be potentially affected by this project, involving at least one impact that is a "Potentially Significant Impact" as indicated by the checklist on the following pages.

☒	Aesthetics		Agriculture Resources	☒	Air Quality
☒	Biological Resources	☒	Cultural Resources	☒	Geology/Soils
	Hazards/Hazardous Materials		Hydrology/Water Quality		Land Use/Planning
	Mineral Resources	☒	Noise		Population/Housing
	Public Services		Recreation	☒	Transportation/Traffic
	Utilities/Service Systems		Mandatory Findings of Significance		

DETERMINATION:

On the basis of this initial evaluation:

☐ I find that the proposed project COULD NOT have a significant effect on the environment, and a NEGATIVE DECLARATION will be prepared.

☐ I find that although the proposed project could have a significant effect on the environment, there will not be a significant effect in this case because revisions in the project have been made by or agreed to by the applicant. A MITIGATED NEGATIVE DECLARATION will be prepared.

☒ I find that the proposed project MAY have a significant effect on the environment, and an ENVIRONMENTAL IMPACT REPORT is required.

☐ I find that the proposed project MAY have a "potentially significant impact" or "potentially significant unless mitigated" on the environment, but at least one effect 1) has been adequately analyzed in an earlier document pursuant to applicable legal standards, and 2) has been addressed by mitigation measures based on the earlier analysis as described on attached sheets. An ENVIRONMENTAL IMPACT REPORT is required, but it must analyze only the effects that remain to be addressed.

☐ I find that although the proposed project could have a significant effect on the environment because all potentially significant effects (a) have been analyzed adequately in an earlier Environmental Impact Report pursuant to applicable standards, and (b) have been avoided or mitigated pursuant to that earlier Environmental Impact Report, including revisions or mitigation measures that are imposed upon the proposed project, nothing further is required.

_____ _____
Signature Date

_____ _____
Printed Name For

EVALUATION OF ENVIRONMENTAL IMPACTS:

1. A brief explanation is required for all answers except "No Impact" answers that are adequately supported by the information sources a lead agency cites in the parentheses following each question. A "No Impact" answer is adequately supported if the referenced information sources show that the impact simply does not apply to projects like the one involved (e.g., the project falls outside a fault rupture zone). A "No Impact" answer should be explained where it is based on project-specific factors as well as general standards (e.g., the project will not expose sensitive receptors to pollutants, based on a project-specific screening analysis).

2. All answers must take account of the whole action involved, including off-site as well as on-site, cumulative as well as project-level, indirect as well as direct, and construction as well as operational impacts.

3. "Potentially Significant Impact" is appropriate if there is substantial evidence that an effect may be significant. If there are one or more "Potentially Significant Impact" entries when the determination is made, an EIR is required.

4. "Negative Declaration: Less Than Significant With Mitigation Incorporated" applies where the incorporation of mitigation measures has reduced an effect from "Potentially Significant Impact" to a "Less Significant Impact." The lead agency must describe the mitigation measures, and briefly explain how they reduce the effect to a less than significant level (mitigation measures from Section XVII, "Earlier Analyses," may be cross-referenced).

5. Earlier analyses may be used where, pursuant to the tiering, program EIR, or other CEQA process, an effect has been adequately analyzed in an earlier EIR or negative declaration. Section 15063 (c) (3) (D). Earlier analyses are discussed in Section XVII at the end of the checklist.

6. Lead agencies are encouraged to incorporate into the checklist references to information sources for potential impacts (e.g., general plans, zoning ordinances). Reference to a previously prepared or outside document should, where appropriate, include a reference to the page or pages where the statement is substantiated.

7. Supporting Information Sources: A source list should be attached, and other sources used or individuals contacted should be cited in the discussion.

8. This is only a suggested form, and lead agencies are free to use different ones.

9. The analysis of each issue should identify:

    a) the significance criteria or threshold used to evaluate each question; and
    b) the mitigation measure identified, if any, to reduce the impact to less than significance

ENVIRONMENTAL CHECKLIST FORM

	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
Issues (and Supporting Information Sources):				
I. AESTHETICS/VISUAL QUALITY Would the project:				
a) Have a substantial adverse effect on a scenic vista?				☒
b) Damage scenic resources, including, but not limited to, trees, rock outcropping, and historic buildings within a state scenic highway?				☒
c) Substantially degrade the existing visual character or quality of the site and its surroundings?		☒		
d) Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?				☒

a) The project sites are not within a designated scenic vista.
b) The project sites are not located within a state scenic highway and no impacts to trees, rock outcrops or historic buildings would result from the project.
c) At Estates Reservoir, there will be a change to visual character due to the removal of the existing 2.5 acre reservoir roof, fountains and planter, and construction of two new buried tanks with a total roof surface area of 0.6 acres. The views from the streets and surrounding residences into the site will be improved since the entire reservoir bowl and buried tanks will be landscaped with grasses and native shrubs, to provide continuity with existing site landscaping. At Dingee Reservoir, there will be no change to visual character because no physical improvements are proposed to the site. Dingee Reservoir will be drained and placed out of service once Estates Reservoir improvements are completed and the new Estates tanks are in service.
d) No permanent external lighting will be installed as part of this project.

Detailed analysis of potential impacts associated with Aesthetics/Visual Quality is contained in the Project Draft EIR.

ENVIRONMENTAL IMPACT CHECKLIST

	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
Issues (and Supporting Information Sources):				
II. AGRICULTURE RESOURCES. In determining whether impacts to agricultural resources are significant environmental effects, lead agencies may refer to the California Agricultural Land Evaluation and Site Assessment Model prepared by the California Dept. of Conservation as an optional model to use in assessing impacts on agriculture and farmland. Would the project:				
a) Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland) to non-agricultural use? (The Farmland Mapping and Monitoring Program in the California Resources Agency, Dept. of Conservation, maintains detailed maps of these and other categories of farmland.)				☒
b) Conflict with existing zoning for agricultural use, or a Williamson Act contract?				☒
c) Involve other changes in the existing environment which, due to their location or nature, could individually or cumulatively result in loss of Farmland, to non-agricultural use?				☒

a) The project site is not designated as Prime Farmland, Unique Farmland, or Farmland of Statewide Importance. It is located within an urban area surrounded by residential uses.

b) The project site is not currently zoned for agricultural use nor is it under a Williamson Act contract for agricultural preservation. Therefore there is no potential for significant impact, therefore additional analysis (and/or mitigation measures) is not required in the project Draft EIR.

c) See a) above.

ENVIRONMENTAL IMPACT CHECKLIST

	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
Issues (and Supporting Information Sources):				
III. AIR QUALITY. Where available, the significance criteria established by the applicable air quality management or air pollution control district may be relied upon to make the following determinations. Would the project:				
a) Conflict with or obstruct implementation of the applicable Air Quality Attainment Plan or Congestion Management Plan?		☒		
b) Violate any stationary source air quality standard or contribute to an existing or projected air quality violation?		☒	☒	
c) Result in a net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors)?		☒		
d) Expose sensitive receptors to substantial pollutant concentrations?			☒	
e) Create objectionable odors affecting a substantial number of people?			☒	

a) The project would not conflict with the implementation of an air quality plan. Potential impacts are associated with the demolition and replacement tank construction activity. General estimated basin-wide construction-

related emissions are included in the BAAQMD emission inventory (which, in part, forms the basis for the Clean Air and Ozone Attainment plans) and are not expected to prevent attainment or maintenance of the ozone, particulate matter, and carbon monoxide standards within the Bay Area..

b) Potential criteria air pollutants that could be generated during construction include particulate (dust) related to, earth movement, demolition and debris, and to a lesser extent, carbon monoxide, hydrocarbons, nitrogen oxides and sulfur dioxides associated with combustion emissions from construction equipment and trucks. Short-term construction related impacts will be mitigated with dust and emission control measures, including the partial list below. These mitigation measures will reduce potential impacts to a Less than Significant level. Detailed analysis is presented in the Project Draft EIR. Mitigation measures which will be included in the construction specifications for the project, include:
   - Sprinkling water or using crushed granite on exposed soil on the construction site to prevent airborne dust from leaving the site
   - Covering or daily spraying of stockpile areas
   - Dust producing material shall be covered while being hauled
   - Washing the wheels of hauling trucks when exiting project sites (to prevent tracking excessive dirt on nearby roadways)
   - Construction equipment shall not idle in place for more than one-half hour

c) The Project could result in a net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors). Notwithstanding Project generated impacts, maximum background levels of particulate matter (PM10, PM2.5) already exceed state or federal standards as applicable in the Project vicinity. Therefore, the Project would incrementally contribute to these existing exceedences. The BAAQMD has developed emission control measures for construction emissions that, when implemented by EBMUD, reduce the impacts to less than significant. Detailed analysis and mitigation measures are included in the Project Draft EIR.

d) See discussion for b) above.

e) Demolition of construction debris on-site has the potential to generate minor odors. To minimize potential diesel odor impacts on nearby receptors (pursuant to BAAQMD Regulation 1, Rule 301, Nuisance), construction equipment will be properly tuned, and this requirement will be included in the Draft EIR mitigation measures. Operation of the new tanks will not generate long-term objectionable odors.

ENVIRONMENTAL IMPACT CHECKLIST

	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
Issues (and Supporting Information Sources):				
IV. BIOLOGICAL RESOURCES. Would the project:				
a) Have a substantial adverse impact, either directly or through habitat modifications on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations or by the California Dept. of Fish & Game or U.S. Fish & Wildlife Service?		☒		
b) Have a substantial adverse impact on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations or by the California Dept. of Fish & Game or U.S. Fish & Wildlife Service?		☒		
c) Adversely impact federally protected wetlands (including, but not limited to, marsh, vernal pool, coastal, etc.) either individually or in combination with the known or probable impacts of other activities through direct removal, filling, hydrological interruption, or other means?				☒
d) Interfere substantially with the movement of any resident or migratory fish or wildlife species or with established resident or		☒		

	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
migratory wildlife corridors, or impede the use of wildlife nursery sites?				
e) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?				☒
f) Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Conservation Community Plan, or other approved local, regional, or state habitat conservation plan?				☒

a) EBMUD biologists conducted site surveys on August 5, 19, 21 and 29, 2008 and determined that the project site does not contain habitat for species identified as a candidate, sensitive or special status plant or animal, therefore there is no impact.

b & c) The project site is not located in the vicinity of a riparian habitat or other sensitive natural community and no impacts would result. The site has no jurisdictional wetlands as defined by Section 401 and 404 of the Clean Water Act and Sections 1600-1616 of the California Fish and Game Code.

d) The project site is fenced and surrounded by residential land uses; therefore, it does not serve as a wildlife dispersal or migration corridor.

e) The project does not conflict with any local ordinances protecting biological resources. The existing site is predominantly developed with the reservoir, pumping plant, and access roads. Limited vegetation would be removed during project demolition and construction; most of the existing trees on the site perimeter would be preserved. Proposed project landscaping will consist of native grasses, ornamental shrubs with native trees, which will augment and complement existing site vegetation. Impact analysis and mitigation measures are included in the Project Draft EIR.

f) There is no Habitat Conservation Plan or other similar approve plan affecting the site.

ENVIRONMENTAL IMPACT CHECKLIST

	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
Issues (and Supporting Information Sources):				
V. CULTURAL RESOURCES. Would the project:				
a) Cause a substantial adverse change in the significance of a historical resource as defined in section 15064.5	☒			
b) Cause a substantial adverse change in the significance of a unique archaeological resource as defined in section 15064.5		☒		
c) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?		☒		
d) Disturb any human remains, including those interred outside of formal cemeteries?		☒		

a) EBMUD proposes to demolish the roof structure as part of the Estates Reservoir Replacement Project. Neither the Estates or Dingee Reservoir sites are listed at present on the Federal or California Register of Historic Places (CRHR). The Estates Reservoir roof structure is recommended as eligible for listing on the CRHR by Garavaglia Architecture, Inc., under Criteria 1 and 3. The proposed Project would therefore have a substantial adverse change in the significance of this resource, as defined in CEQA Guidelines, §15064.5(b). Furthermore, the City of Oakland's Landmark Preservation Advisory Board (LAPB) has initiated a process for designating the Estates Reservoir site as an Oakland historic landmark. As of January 14, 2008, the LAPB has determined that the Estates fountains, planter and surface planes of Estates Reservoir roof are eligible for Oakland Landmark designation and has adopted the LPAB Evaluation Sheet for Landmark Eligibility with a rating of "B". Detailed analyses, impacts and mitigation measures are contained in the Project Draft EIR.

b-d) The two project sites are located on developed land that has been subject to extensive prior excavation and disturbance. All project work will occur in areas that have been previously disturbed. It is unlikely that unique archeological, paleontology resources or human remains exist at these three sites. However, if remains or archeological features are uncovered during demolition or construction at Estates Reservoir site, the standard protocol will be followed to preserve and protect such features. Generally this will consist of stopping work until such time as a qualified archeologist can determine significance. Mitigation measures to address this potential are included in the Project D raft EIR.

ENVIRONMENTAL IMPACT CHECKLIST

	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
Issues (and Supporting Information Sources):				
VI. GEOLOGY AND SOILS. Would the project:				
a) Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:		☒		
i) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault?		☒		
ii) Strong seismic ground shaking?		☒		
iii) Seismic-related ground failure, including liquefaction?		☒		
iv) Landslides)		☒		
b) Would the project result in substantial soil erosion or the loss of topsoil?		☒		
c) Is the project located on strata or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse?		☒		
d) Is the project located on expansive soil creating substantial risks to life or property?			☒	
e) Where sewers are not available				☒

	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
for the disposal of wastewater, is the soil capable of supporting the use of septic tanks or alternative wastewater disposal systems?				

a) (i to iv). The two project sites are located in a highly active seismic area. Both reservoir sites are located within one-half mile of the Hayward Fault. The San Andreas Fault is located approximately 20 miles to the West and the Calaveras Fault is 15 miles to the East. All existing roof structures and reservoir embankment will likely suffer heavy damage if a major earthquake event occurs. By implementing this project, new facilities will be built to current industry standards that will enable the facility to better withstand damage resulting from any such seismic event. Detailed analyses, including impacts and mitigation measures are contained in the Project Draft EIR.

b) The project will not produce substantial erosion or loss of topsoil. Approximately 25 feet of the existing embankment at Estates Reservoir will be demolished and reused at the site for backfilling the two new buried tanks. However, this material is not highly erodible; if any erosion does occur it will be contained within the existing basin. Detailed analyses, including impacts and mitigation measures are contained in the Project Draft EIR.

c) The existing embankments at Dingee and Estates reservoirs are subject to potential lateral spreading, subsidence and localized liquefaction resulting from a nearby major earthquake on the Hayward or San Andreas Fault. The proposed project will dewater the existing Estates reservoir and reduce the height of the Estates embankment by approximately 25 feet . Once the replacement Estates tanks are constructed and in service, the Dingee Reservoir will be drained and placed out of service, thereby eliminating the need to remediate the Dingee embankment. Detailed analyses, including impacts and mitigation measures are contained in the Project Draft EIR.

d) The shrink-swell potential of soils at the Estates reservoir site is low and does not pose substantial risks to life or property.

e) Municipal sewers currently serve the reservoir sites. Impacts from septic systems do not apply to this project.

ENVIRONMENTAL IMPACT CHECKLIST

	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
Issues (and Supporting Information Sources):				
VII. HAZARDS AND HAZARDOUS MATERIALS. Would the project:				
a) Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?			☒	
b) Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the likely release of hazardous materials into the environment?			☒	
c) Reasonably be anticipated to emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?				☒
d) Is the project located on a site which is included on a list of hazardous materials sites complied pursuant to Government Code Section 65962.5 and as a result, would it create a significant hazard to the public or the environment?				☒
e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the				☒

	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
project result in a safety hazard for people residing or working in the project area?				
f) For a project within the vicinity of a private airstrip, would the project result in a safety hazard for people residing or working in the project area?				☒
g) Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?				☒
h) Expose people or structures to the risk of loss, injury or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands?				☒

a) The existing Estates Reservoir roof structure contains wood preservatives including pentachlorophenol. State and Federal Regulations limit reuse of pentachloraphenol treated lumber to the site of origin and for "similar uses". The proposed landscape plan for Estates Reservoir does not include re-use of any petachloraphenol treated wood for ancillary landscape features, but there may be potential reuse for temporary forming, bracing and shoring applications during construction. Any wood not appropriately reused on site will be handled, transported and disposed of at an appropriate waste disposal site (Keller Canyon). No unregulated hazardous substances will be used or present when new project components are in service.

The potential for silicosis exposure (related to demolition, concrete recycling and construction activities) is considered less than significant because dust and particulate matter controls utilized by the contractor and required as part of the contract specifications (see Air Quality section of the EIR) will ensure that levels of silica and other particulate materials are not harmful either to workers at the site or sensitive receptors (residents) in vicinity of the site. All construction activities would occur in accordance with applicable federal and state requirements relative to health and safety, including CAL-OSHA requirements.

Therefore there is no significant hazard/impact to the public or the environment through the routine transport, use, or disposal of hazardous materials and no further analysis or mitigation measures are proposed in the Project Draft EIR.

b) Routine maintenance of distribution facilities entails dechlorination of potable water from reservoirs prior to release into the sewer or storm water system. For reservoir outages, sediment from tanks is containerized and disposed of in compliance with state and federal regulations. Therefore there is no significant impact to the public or the environment significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the likely release of hazardous materials into the environment, and no further analysis or mitigation measures are proposed.

c) There is no existing or proposed school within one-quarter mile of any project site. The project does not involve or generate hazardous waste (see responses to a. and b. above).
d) Pursuant to Government Code Section 65962.5, neither project site is listed on a hazardous materials site list.
e) Neither project site is located within an airport land-use plan, or within two miles of a public airport, public use airport or private airstrip.
f) See response for e. above.
g) The project would not affect the implementation of any emergency response or evacuation plan.
h) The proposed project would be not expose people to risk of loss, injury or death involving wildland fires. EBMUD maintains site landscaping in compliance with the Oakland Fire Department Fire Abatement Regulations.

ENVIRONMENTAL IMPACT CHECKLIST

	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
Issues (and Supporting Information Sources):				
VIII. HYDROLOGY AND WATER QUALITY. Would the project:				
a) Violate Regional Water Quality Control Board water quality standards or waste discharge requirements?				☒
b) Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (i.e., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted?				☒
c) Substantially after the existing drainage pattern of the site area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on- or off-site?				☒
d) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site?				☒

	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
e) Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems to control?				☒
f) Otherwise substantially degrade water quality?				☒
g) Place housing within a 100-year flood plain, as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map?				☒
h) Place within a 100-year flood plain structures which would impede or redirect flood flows?				☒
i) Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam?				☒
j) Inundation by seiche, tsunami, or mudflow?				☒

a) The EBMUD water distribution system/facilities are designed, constructed, operated and maintained to conform to state and federal requirements for water treatment and discharge, thus no impacts to water treatment and discharge are anticipated and no further analysis and/or mitigation measures are proposed.

b) The project would not deplete groundwater supplies or recharge, because the permeable site surface will increase, with a commensurate increase in infiltration (from precipitation), groundwater and recharge. No drinking water wells are located in the vicinity of the project site and thus no impacts to groundwater are anticipated and no further analysis and/or mitigation measures are proposed.

c) Natural drainage features at the project site will not be altered, but an increase in percolation and water collection at the proposed valve pit (in the reservoir bowl) is anticipated once the concrete reservoir lining is removed. Any increased water will easily percolate through the soil downstream into the existing culverted creek. Drainage patterns may be temporarily disrupted during construction. No impacts to the existing drainage system are anticipated and no further analysis and/or mitigation measures are proposed.

d) Existing drainage patterns will be utilized (c., above).

e&f) The project will not increase storm water run-off. New and modified drainage located within the reservoir basin will tie into the existing storm drainage located at both sites, thus the project will not substantially degrade existing groundwater water quality, and thus no impacts to storm water are anticipated, and no further analysis and/or mitigation measures are proposed.

g&j) The project sites are not located within a 100-year flood plain. The project would eliminate the potential for flooding as a result of the failure of a dam.

ENVIRONMENTAL IMPACT CHECKLIST

	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
Issues (and Supporting Information Sources):				
IX. LAND USE AND PLANNING. Would the project:				
a) Physically divide an established community?				☒
b) Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to the general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect?				☒
c) Conflict with any applicable habitat conservation plan or natural communities conservation plan?				☒

a) The project site is already developed with a reservoir, and the proposed Project is a replacement of the same use but with smaller tanks; thus the project is an established land-use within an established residential community. There will be no change of land–use, and the project will not physically divide an established community. Therefore there is no impact to Land-Use/Planning and no further analysis and/or mitigation measures are proposed in the Project Draft EIR.

b) EBMUD is not subject to the building and zoning ordinances of local jurisdiction for projects involving the storage of water (refer to section 53091 of California State Planning, Development, and Zoning Regulations). However, it is EBMUD's practice to be consistent with the regulations of all local jurisdictions to the extent feasible, where such actions would not compromise EBMUD's public purpose or responsibilities.

c) Refer to item f) in the Biological Resources section, page 14.

ENVIRONMENTAL IMPACT CHECKLIST

	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
Issues (and Supporting Information Sources):				
X. MINERAL RESOURCES. Would the project:				
a) Result in the loss of availability of a known mineral resource classified MRZ-2 by the State Geologist that would be of value to the region and the residents of the state?				☒
b) Result in the loss of availability of a locally important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan?				☒

a & b).Demolition of the existing reservoir and construction of new facilities will occur on previously disturbed areas and will not expose or disturb valuable or locally important mineral resources. Furthermore, existing urban/residential conditions at the Project site and within the vicinity limit the potential for any quarrying or mining activity at the site. According to the City of Oakland General Plan, Open Space and Recreation Element Technical Appendices, 1993, although quarrying for volcanic rocks was once commonplace throughout the Oakland Hills, and has historically been used for construction and development, today there are no remaining quarries in the City and current city policy prohibits quarrying unless compelling evidence can be presented indicating that the benefits will outweigh the environmental costs. For the reasons stated herein (a&b) there will be no impacts to Mineral Resources and no further analysis and/or mitigation measures are proposed in the Project Draft EIR.

ENVIRONMENTAL IMPACT CHECKLIST

	Potentially Significant Impact	**Less Than Significant With Mitigation Incorporated**	**Less Than Significant Impact**	**No Impact**
Issues (and Supporting Information Sources):				
XI. NOISE. Would the project result in:				
a) Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?	☒			
b) Exposure of persons to or generation of excessive ground borne vibration or ground borne noise levels?		☒		
c) A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?				☒
d) A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?	☒			
e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?				☒

	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
f) For a project within the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise levels?				☒

a,b,c&d) Normal operation of the reservoirs would not generate noise that exceeds ambient noise levels.

Although EBMUD is not subject to local jurisdiction zoning ordinances for projects involving the storage of water (refer to section 53091 of California State Planning, Development, and Zoning Regulations), EBMUD strives to be consistent with local noise ordinances during construction, where feasible and not contrary to its public purpose and responsibilities.

Construction activities associated with the project will elevate noise levels for short/intermittent intervals during the construction period which is anticipated to extend from 18 to 24 months. For example, trucks are anticipated to arrive every ½ hour for concrete pours on the new tanks. Back-up alarms on the trucks generate noise levels of approximately 75 dBA-weighted decibels at 200 feet away. Elevated noise level is dependent on the number and pieces of equipment to be used and the intensity of the activities, and will vary over the construction period.

In recognition of the residential neighborhood setting, EBMUD will limit construction activities to the hours of 7:00 AM to 7:00 PM weekdays. Weekend and overtime work requires prior approval of EBMUD and is limited in practice to critical construction segments or unforeseen emergencies. Residents will be notified in advance of any weekend or overtime work deemed essential.

Construction related truck-trips would increase noise along haul routes to the sites, but this would only be significant for the segments within existing residential communities. These trips should occur during work hours and during the workweek; therefore this impact is considered less than significant because of its short-term nature.

The project would not involve pile driving. However, removal of the concrete reservoir liner and processing of construction debris into loose materials for on-site reuse may create temporary increases in noise levels and generate ground level vibration. The benefit to processing and re-using construction material on-site would be fewer truck trips and truck traffic to the site, than if the demolition debris

Potentially significant impacts associated with construction activities are fully explored in the Project Draft EIR, and mitigation measures are proposed to reduce impacts.

e&f) Neither the Estates or Dingee project sites is located within an airport land use plan, or is within two miles of a public airport or a private airstrip.

ENVIRONMENTAL IMPACT CHECKLIST

	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
Issues (and Supporting Information Sources):				
XII. POPULATION AND HOUSING. Would the project:				
a) Induce substantial population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?				☒
b) Displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere?				☒
c) Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere?				☒

a) The project will not induce population growth by making additional water supply available for new development. The project refurbishes and replaces existing facilities to improve water quality and reliability of the existing water distribution system that currently serves customers in the City of Piedmont and Oakland. Only planned growth, approved and permitted by these two cities will be served by these improved facilities.
b) No housing presently exists at the project site; therefore, the proposed project would not displace housing.
c) The project would not displace people or housing from the site and no relocation would be required.

For the reasons stated above (a&b), there are no impacts to Population and Housing and no further analysis and/or mitigation measures are identified in the Project Draft EIR.

ENVIRONMENTAL IMPACT CHECKLIST

	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
Issues (and Supporting Information Sources):				
XIII. PUBLIC SERVICES. a) Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services:				
Fire protection?				☒
Police protection?				☒
Schools?				☒
Parks?				☒
Other public facilities?				☒

a) The project replaces existing water distribution facilities only. The project will not generate additional need for fire protection, police protection, schools, parks, and other public facilities because it does not induce population and employment growth. Workers at the site are likely to commute from the existing labor supply in Oakland and adjacent communities; they would not stimulate demand for new housing in the area. For the reasons stated herein, no impacts to Public Services are associated with the Project and no further analysis and/or mitigation measures is undertaken in the Project Draft EIR.

ENVIRONMENTAL IMPACT CHECKLIST

	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
Issues (and Supporting Information Sources):				
XIV. RECREATION.				
a) Would the project increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?				☒
b) Does the project include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment?				☒

a) The project will not generate or attract additional population, as would be associated with residential, commercial or industrial uses; therefore it would not affect demand for recreational facilities.

b) There are no existing or proposed recreational facilities within the vicinity of this site. The proposed landscape plan includes a jogging trail, but joggers and hikers presently use the site without the improved trail. Residents have indicated that they want to continue to use the site for hiking and jogging.

For the reasons stated above (a&b), no impacts to Public Services are associated with the Project and no further analysis and/or mitigation measures is undertaken in the Project Draft EIR.

ENVIRONMENTAL IMPACT CHECKLIST

	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
Issues (and Supporting Information Sources):				
XV. TRANSPORTATION/TRAFFIC Would the project:				
a) Cause an increase in traffic which is substantial in relation to the existing traffic load and capacity of the street system (i.e., result in a substantial increase in either the number of vehicle trips, the volume to capacity ratio on roads, or congestion at intersections)??	☒			
b) Exceed, either individually or cumulatively, a level of service standard established by the county congestion management agency for designated roads or highways?			☒	
c) Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks?				☒
d) Substantially increase hazards to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?		☒		
e) Result in inadequate emergency access?			☒	
f) Result in inadequate parking capacity?		☒		
g) Conflict with adopted policies supporting alternative transportation				☒

	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
(e.g., bus turnouts, bicycle racks)?				

a) The project would generate vehicle trips during project construction, temporarily contributing to increased traffic on local roadways. Truck trips would be associated with hauling materials, debris and equipment to and from the site. Construction employees would also contribute to vehicle trips. All streets would continue to operate below their theoretical daily capacity, except for La Salle Avenue, west of Trafalgar Place. The addition of Project traffic to this roadway segment would exacerbate an existing deficient condition, resulting in a near-term significant impact.

Vehicles traveling to the site from Hwy 13 will be using either the Park Boulevard or Moraga Avenue exits. After construction and during on-going project operations, vehicle trips would be few and infrequent, occurring only for routine maintenance activities.

b) Project construction traffic is not expected to significantly degrade signalized intersection operations from existing levels of service (refer to a. above, for the exception).

c) The project would not affect air traffic and no impacts related to air traffic or safety would result.

d) The project would not result in any permanent changes to existing traffic design features, but traffic hazards related to truck traffic negotiating sharp curves along Estates Drive could be exacerbated during construction. Contract specifications would require implementation of a traffic safety plan (including flaggers) during the construction period.

e) The project would not impact emergency access because contract specifications will require the contractor to maintain roadway access at all times.

f) Parking needs generated by the construction of the project will be accommodated on EBMUD property and potentially adjacent to EBMUD property along Estates Drive. On-going/routine construction and maintenance of facilities after construction would not generate the need for off-site parking, as the project design includes ample on-site parking.

g) Post construction, and during normal operations, the project would generate fewer than five vehicle trips per day per site. Therefore it would not affect policies supporting alternative transportation.

Potential impacts associated with Traffic and Circulation are fully explored in the Project Draft EIR, and mitigation measures are proposed to reduce impacts.

ENVIRONMENTAL IMPACT CHECKLIST

	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
Issues (and Supporting Information Sources):				
XVI. UTILITIES AND SERVICE SYSTEMS. Would the project:				
a) Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board?				☒
b) Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?				☒
c) Require or result in the construction of new storm water drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?				☒
d) Are sufficient water supplies available to serve the project from existing entitlements and resources, or are new or expanded entitlements needed?				☒
e) Has the wastewater treatment provider which serves or may serve the project determined that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?				☒

	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
f) Is the project served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs?			☒	
g) Comply with federal, state, and local statures and regulations related to solid waste.			☒	

a, b, c& e) The project does not include any wastewater facilities.

d) The project would not result in the need for new additional water supply.

f & g) Solid waste generated in the form of construction debris that cannot be reused at the project site would be disposed of at appropriate receiving locations identified by the contractor in response to standard EBMUD construction specification regarding material off-haul and disposal. On site recycling of concrete and some wood lumber will reduce the amount of construction debris off-hauled from the site. Since EBMUD is reusing as much of the construction debris as feasible and legally permitted, solid waste generation would be a less than significant construction related impact of the project.

For the reasons stated above (a-g), no impacts to Utilities and Service Systems are associated with the Project and no further analysis and/or mitigation measures is undertaken in the Project Draft EIR.

ENVIRONMENTAL IMPACT CHECKLIST

	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
Issues (and Supporting Information Sources):				
XVII. MANDATORY FINDINGS OF SIGNIFICANCE.				
a) Does the project have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory?	☒			
b) Does the project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects)?		☒		
c) Does the project have environmental effects which will cause substantial adverse effects			☒	

	Potentially Significant Impact	**Less Than Significant With Mitigation Incorporated**	**Less Than Significant Impact**	**No Impact**
on human beings, either directly or indirectly?				

a) The project includes the downsizing in size and capacity of water storage facilities. The project will not significantly or adversely impact a sensitive environmental resource. However, it will permanently remove a potentially historic/cultural resource, namely the Estates Reservoir roof, fountains and planters.

b) With the exception of Cultural Resources, all project related impacts are considered short-term and construction related. Only three of the potential environmental impacts of the project are significant after mitigation, namely Transportation/Traffic, Cultural Resources and Noise/Vibration. Impacts to Visual Quality, Air Quality, Greenhouse Gases/Climate Change; Geology, Soils and Seismicity and Biological Resources are less than significant with mitigation. Regarding cumulative impacts, only twelve projects have been identified within a one to three mile radius of the Project site. Due to the generalized level of information available for the projects identified, no cumulative significant impacts are projected, except for Cultural Resources, which would have a cumulative impact within the City of Oakland and State.

c) The project would not result in substantial adverse effects on human beings or their environment, either directly or indirectly.

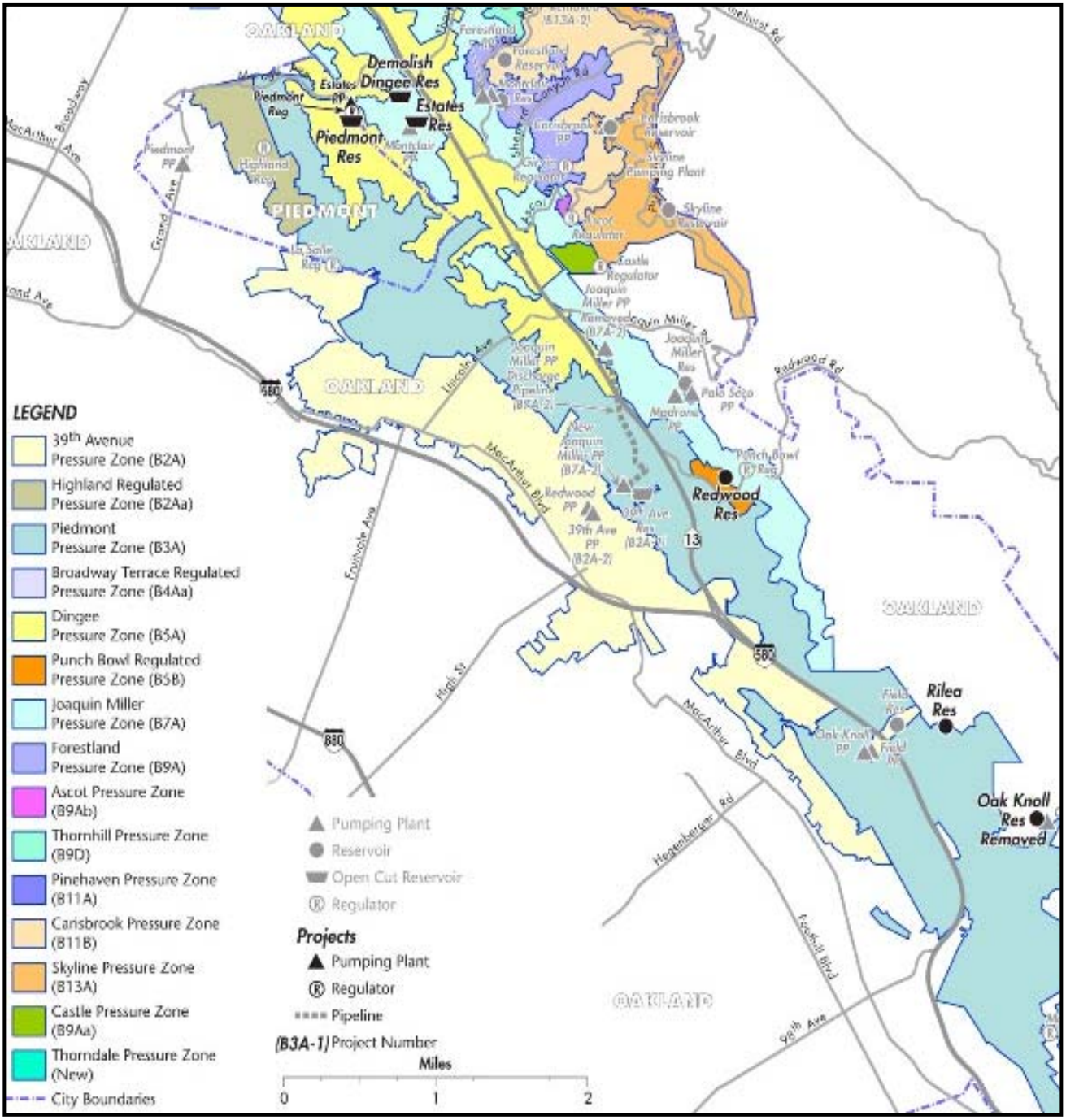

Figure 1
Central Oakland Hills Cascade Project
Dingee Pressure Zone Improvements

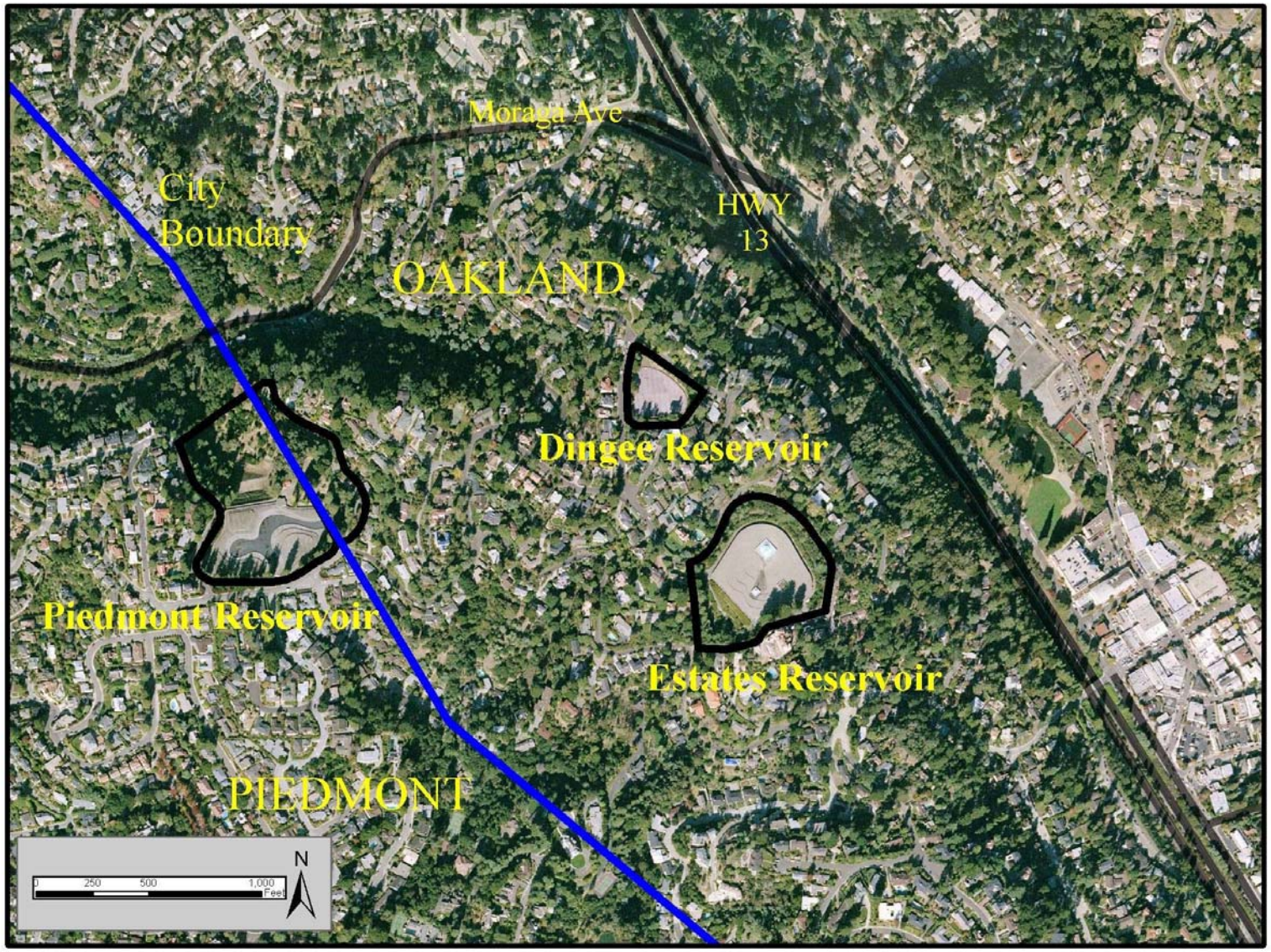

Figure 2
Site Location of Estates and Dingee Reservoirs

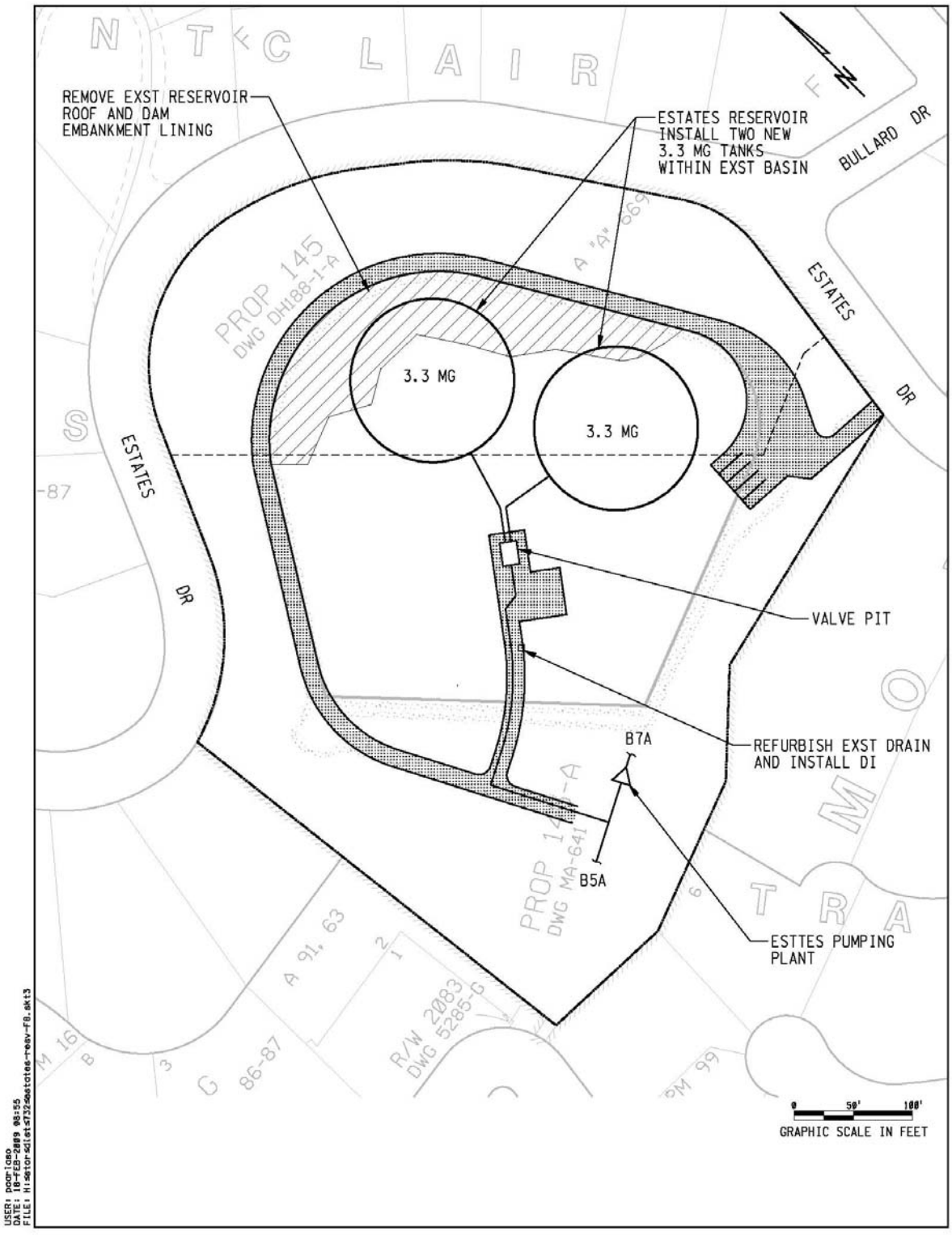

Figure 3
Proposed Improvements at Estates Reservoir

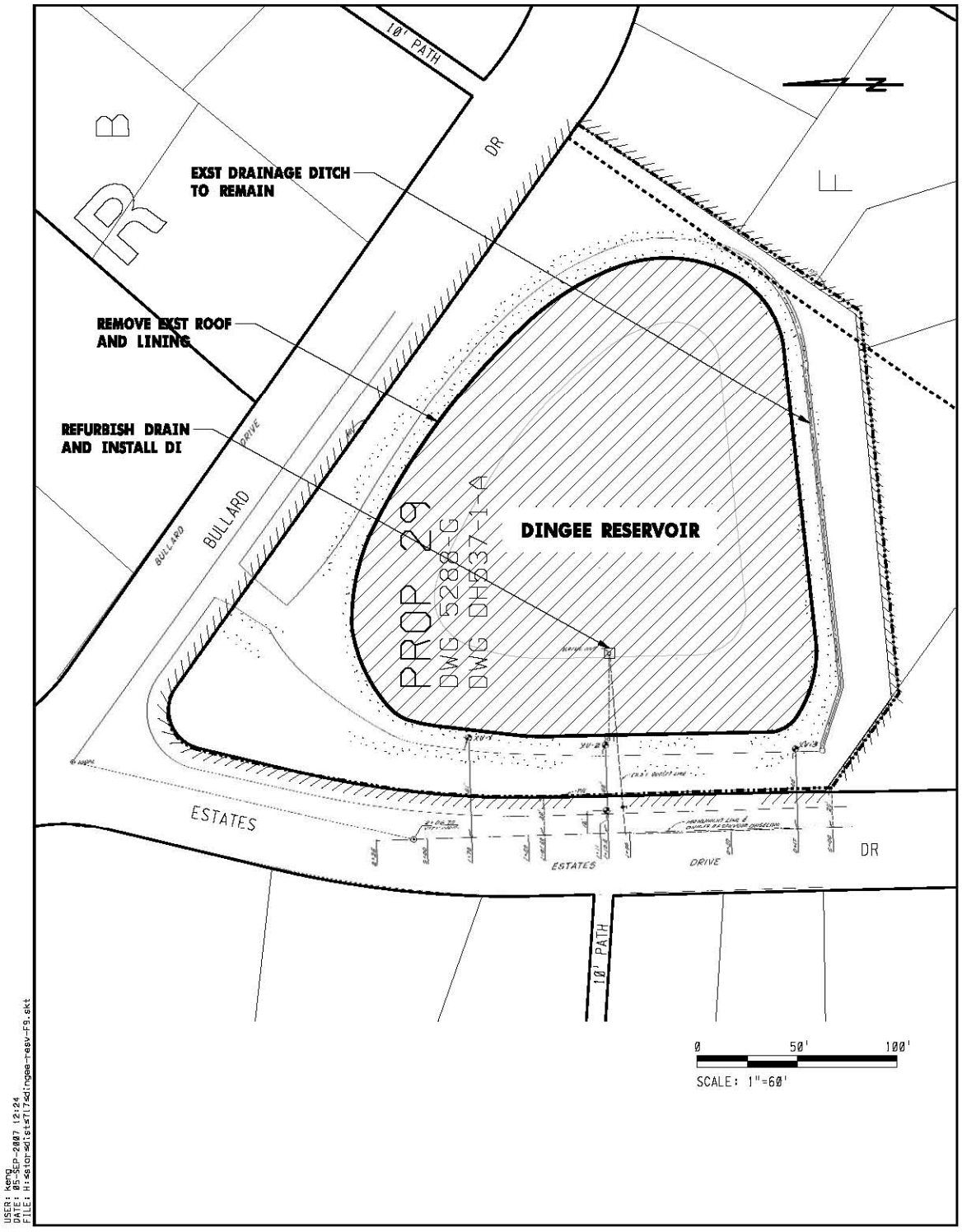

Figure 4
Proposed Improvements at Dingee Reservoir

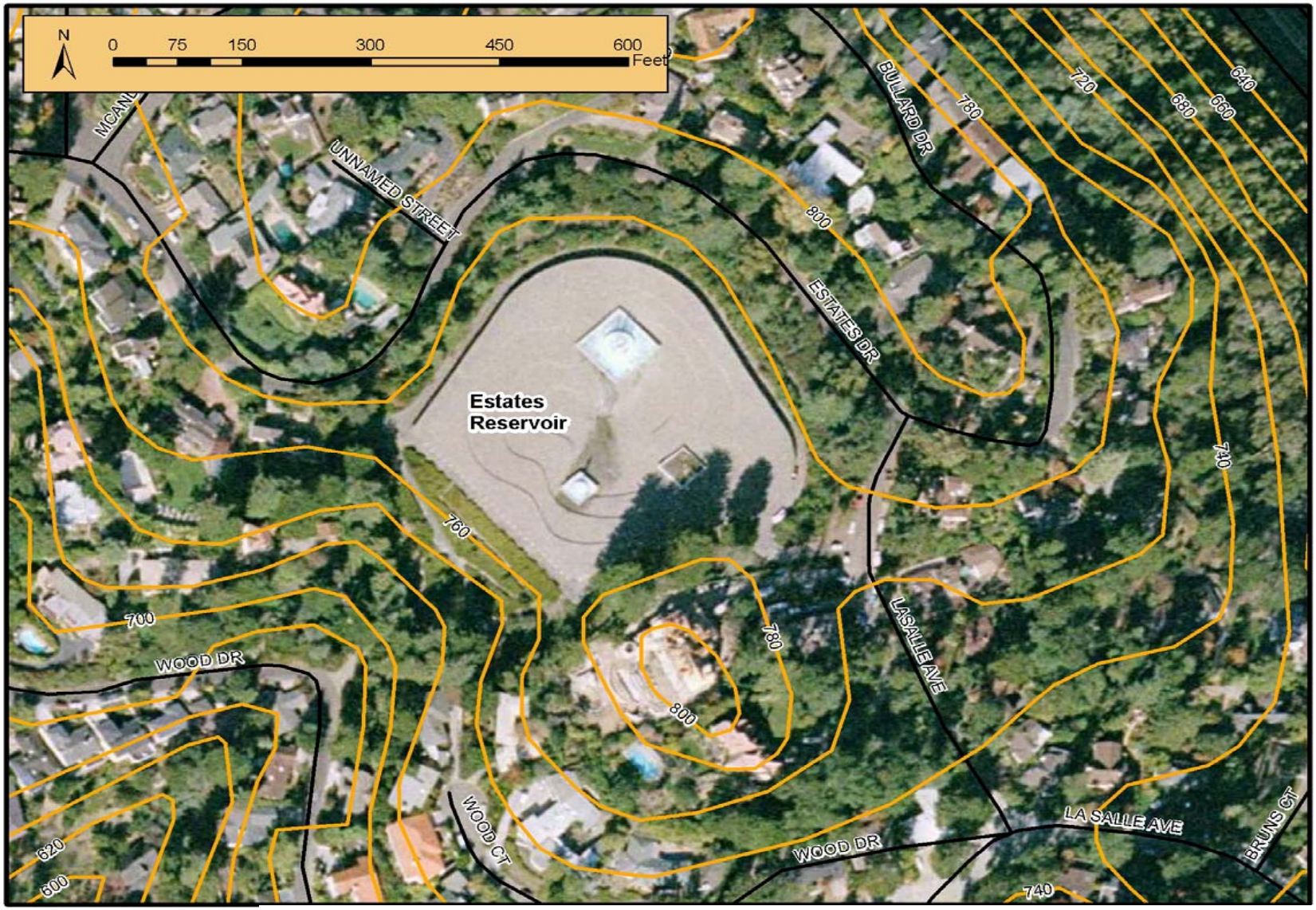

Figure 5
Environmental Setting at Estates Reservoir

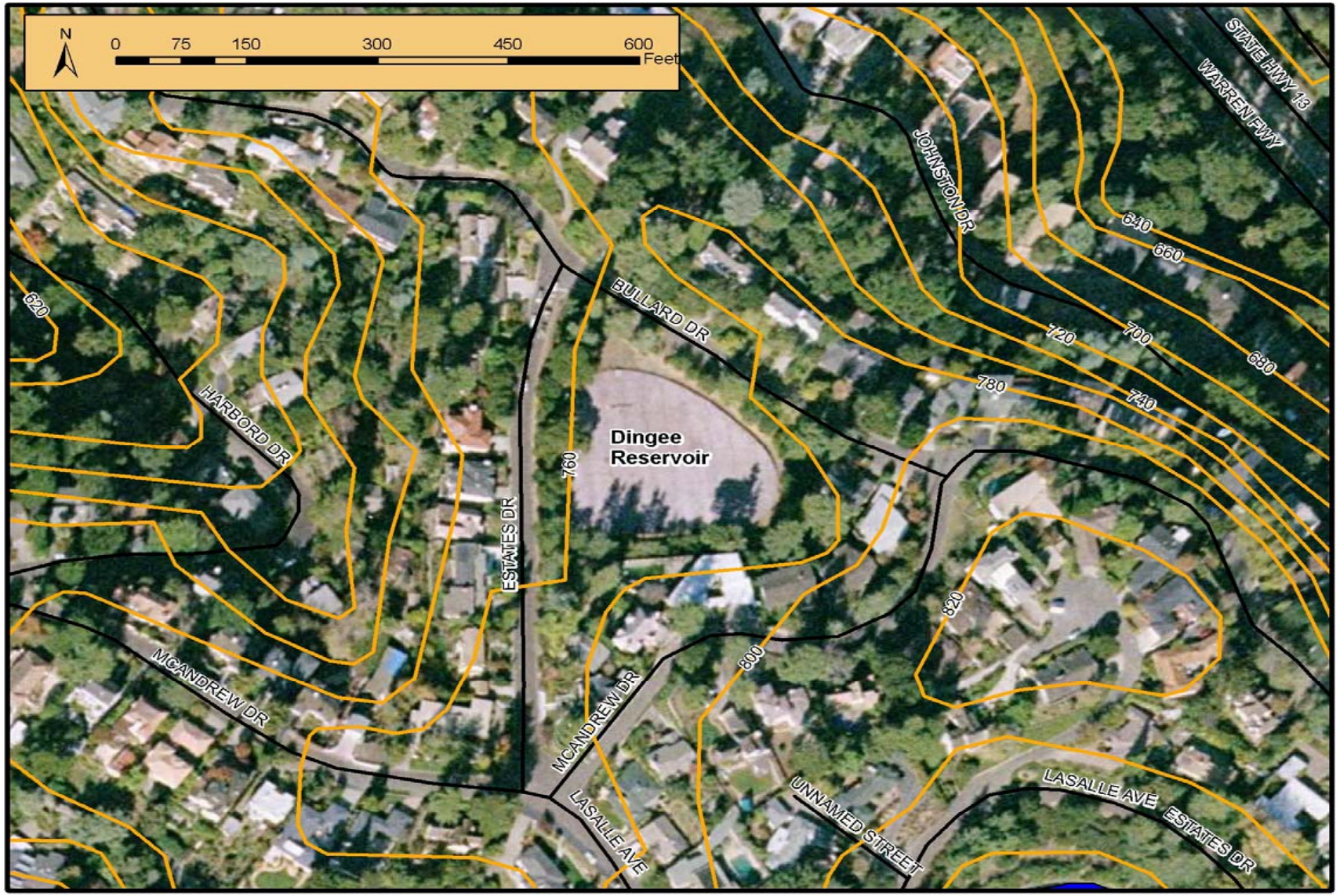

Figure 6
Environmental Setting at Dingee Reservoir